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TECHNOLOGY FOR HIGHER EDUCATION

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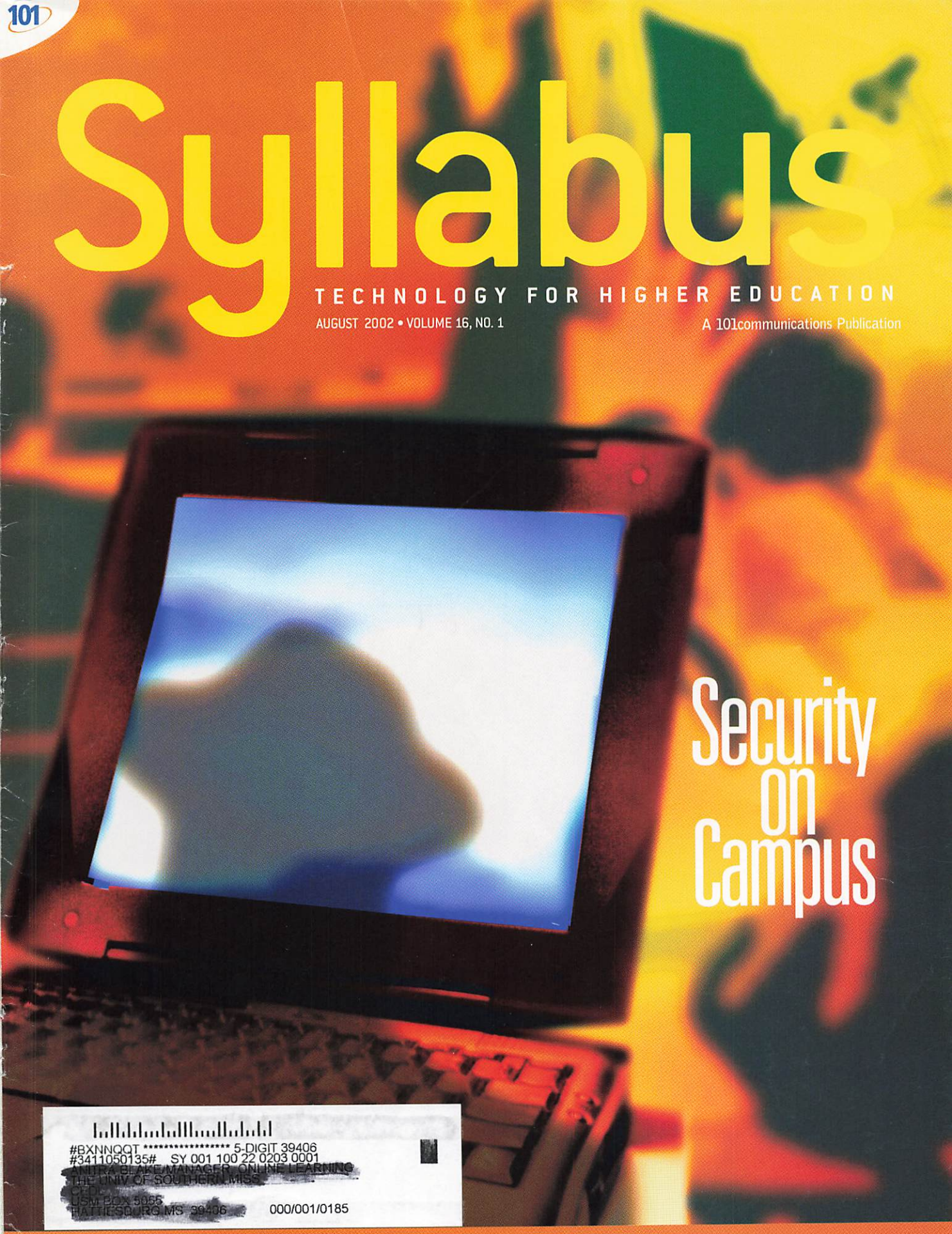

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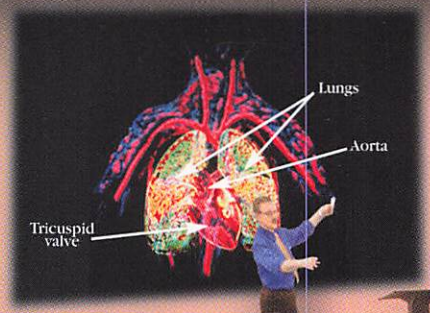

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EDITOR'S NOTE

Mary Grush, Editor

One of the hardest things about security is recognizing the need for it. On the surface, your security requirements may seem insignificant—you can't imagine why anyone would want access to your e-mail or the use of your password to get onto the campus network. And thinking that there might be someone out there on the net waiting to intercept your private communications feels like paranoia.

In higher education, the traditional need for openness, academic freedom, and the sharing of information helped to spawn the early Internet. And we want these values to continue to support teaching and research at colleges and universities. So what are the risks?

The fact is that most of us—happily—aren't tuned into the abuses of our computer systems. And the most dangerous types of foul play are very hard to predict-such as when our networks and resources are turned against us in ways that are not obvious and in no way resemble the original or intended use of these systems. It's entirely possible to think you have all the bases covered and still be attacked in a manner you hadn't anticipated.

Identifying risks and evaluating protection systems generally falls to the IT professionals charged with network security. In this issue, we interview MIT security expert Jeff Schiller (page 12), who points out that security is a "negative deliverable"—you don't necessarily notice when it is missing or malfunctioning, but you always know when it is too late. Jeff addresses the most important issues of security in higher education environments.

Today, most of our electronic communications take place over the Internet. How do you secure your private communications on a public network? And how can the parties of a communication be authenticated? Digital certificates can help. In "Digital Certificates: What Are They, and What are They Doing in My Browser?" (page 16), Judith Boettcher and Amanda Powell answer those questions and introduce the CREN Test CA Demonstration Site, an opportunity for anyone to experiment with a digital certificate. The test certificates are generated through CREN's certificate authority and are offered on the CREN Web site. Try out this interesting Web site and answer the questionnaire to evaluate your experience.

Those who cause malicious mischief in our networks and computer systems now use multiple approaches to ensure their success. In "Blended Threats—A New Risk to Academic Freedom" (page 22) Rick Lesniak examines these strategies and suggests what security measures can be taken against combined assaults. Regardless of how straightforward your systems may seem, it's important to keep in mind that there are many more openings for security problems than one might anticipate. A coordinated effort led by IT security experts is necessary for good security on campus.

It's the end of the summer and we are heading into a new academic year. I hope your calendar for this fall includes Syllabus fall2002, our fourth annual Boston-area conference. This year, the conference will be held in Newton, Mass., close to the city, on November 3-5. For more information, visit www.syllabus.com.

Enjoy this issue of *Syllabus!*

Mary Grush

Letters to the editor should be addressed to the editor and sent to 101 First Street, #605, Los Altos, CA 94022, or via electronic mail. We reserve the right to edit all submissions. **News and product information** will be considered for publication. Please send all materials to Paul McCloskey. If you are interested in writing for *Syllabus*, please send a brief description of your article idea along with writing samples to the editor at the above address.

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TECHNOLOGY FOR HIGHER EDUCATION

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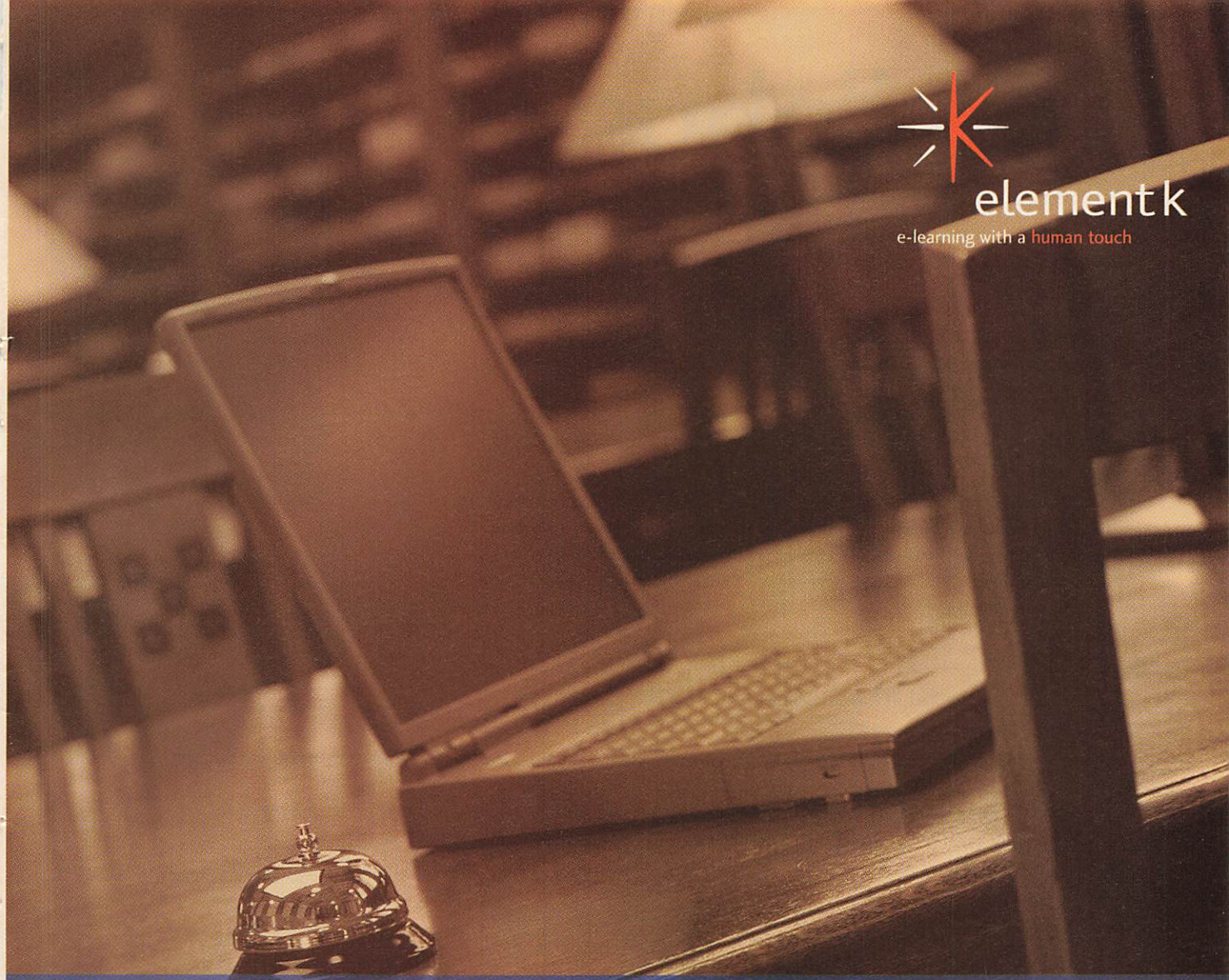

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An Interview with Jeffrey I. Schiller

Security may not be the first thing on everyone's mind; in fact, it may even be difficult to get buy-in to simple, everyday security measures—that is, until there is a problem. In our interview with MIT's Jeff Schiller, we hear from the front lines of campus security regarding how this "negative deliverable" is being deployed in higher education environments.

16 Digital Certificates

What Are They, and What Are They Doing in My Browser?

Judith V. Boettcher and Amanda Powell, CREN

What does a digital fingerprint look like? How do I sign my name electronically? What is it like to use digital certificates? With a free, demonstration Web site, CREN has attempted to shed light on the somewhat confusing area of digital certificates. And in this article, authors from CREN cover the basics and invite readers to experiment with test certificates online.

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22 Blended Threats

A New Risk to Academic Freedom

Rick Lesniak, University at Buffalo

Blended threats, such as Code Red, Nimda, and Klez, employ multiple techniques to transmit and spread an attack. Using a combination of viruses, worms, and Trojan horses, hackers can ensure that their malicious mischief is spread far and wide. What combination of security measures must a university take to counter these combined threats while maintaining traditional academic openness?

28 A Moving Target

eLearning Vendors Take Aim in a Changing Environment

Sharon Gray, Augustana College

Defining the eLearning market space gets harder every day. A combination of strong competition among vendors and new developments in the technology makes for a less-than-clear picture of vendor offerings and product categories. The good news is that there is a lot to choose from, but the continuously changing eLearning landscape makes choices more difficult. In this article, Sharon Gray offers an eLearning inventory to help define this evolving market.

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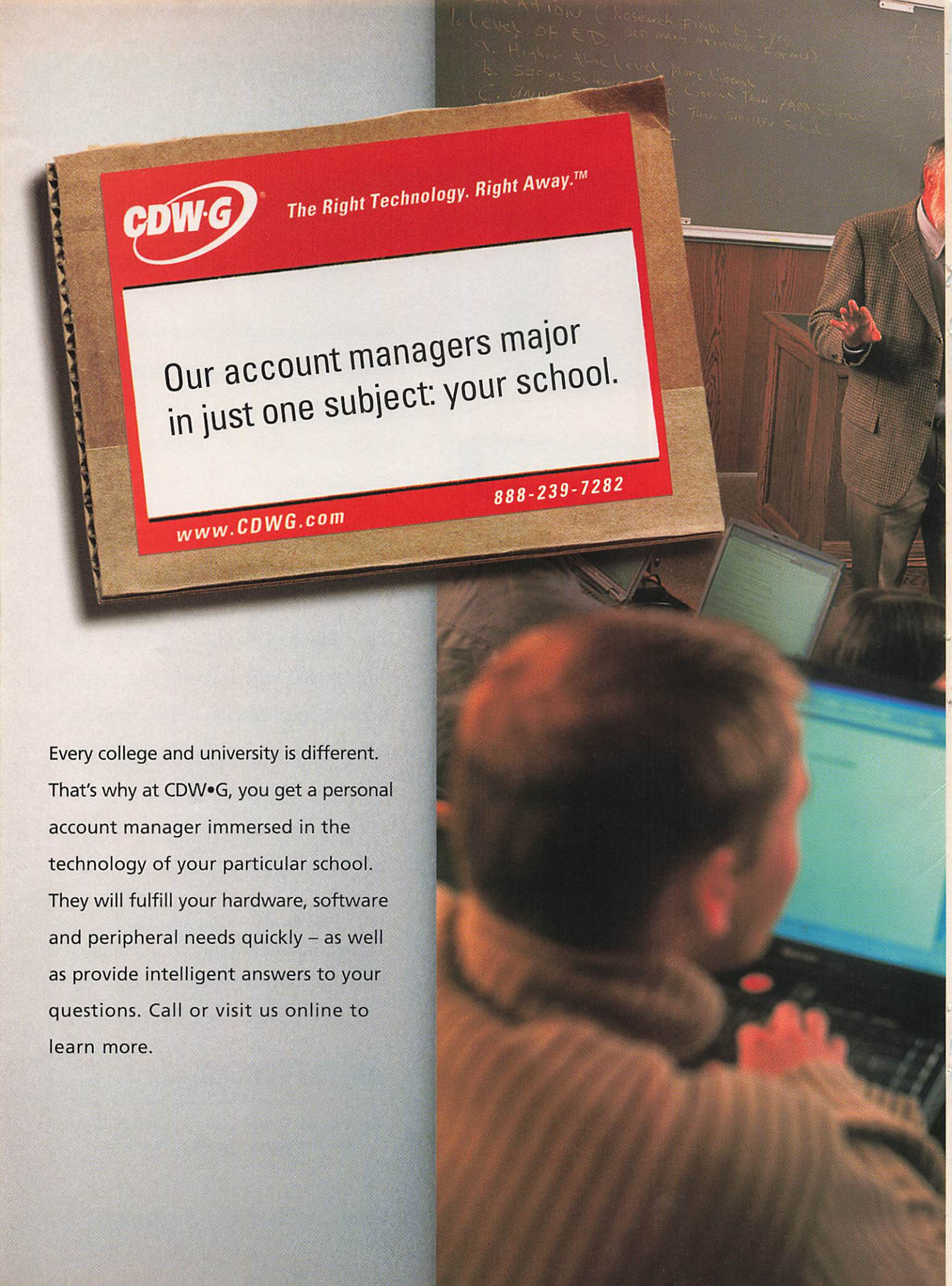

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Phillip D. Long

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TRENDS

AN INFORMATION RESOURCE OF INTEREST TO EDUCATORS

Back to Basics and the Next Big Thing

The other day I watched a lecture presentation that was held in the beginning of the 2001 academic year. Selected speakers invited to present on my campus are captured, with permission, on streaming media for later viewing. The practice is increasingly common and for good reason—we can't attend all the events we'd like to, but we'd prefer not to miss out entirely. Others of us find hearing or seeing things again improves our understanding of the material. I'm a little slow so this helps me a lot.

I listened to the narrative of a faculty member, whom for the sake of privacy, we'll call Alex. He had mortgaged his career on teaching with technology and found himself nearly bankrupted by the experience. Before going on, let me tell the good news: he recovered and received tenure, an outcome that anyone who has seen this fellow teach would have expected. Still, it was touch and go since he hadn't written a major opus in his discipline and instead had invested considerable effort into exploring new teaching approaches with technology. In the recurring nightmare of sixth year faculty, things didn't go well, almost on cue.

His students were among his harshest critics. They blamed him for their frustration at having assignments crunched by bit-stream bandits who stole files that were submitted, or simply when the system wouldn't open the work that was planned for a given seminar. It wasn't a pretty picture. His course evaluations suffered accordingly. But, as a truly committed teacher, Alex set about exploring why things fell apart, and what he intended the students to learn. He found his love of teaching was now eclipsed by his newly kindled interest in student learning. What he found was that many of the goals he had for his students were really implicit. The goals emerged from readings and assignments, but their emergence depended heavily on expert knowledge he wanted them to learn but which they didn't have.

Too often our use of technology can stand apart from our consideration of good teaching. John Seely Brown, in The Social Life of Information (Harvard Business School Press, 2000), suggests that knowledge is a composite of knowing what (explicit knowledge), knowing how (tacit knowledge), and knowing people and their practices. Higher education has focused nearly exclusively on knowing what. We are only starting to get at the active learning approaches that lead more toward knowing how.

It is useful to think about using technologies that would help emphasize these attributes of learning. The vast majority of technology tools are focused on learning "what"—tools that organize learning assets, usually in text forms—for presentation or easy retrieval. There is still lots of room for improvement, especially around tagging and indexing these materials. And while these tools assemble information, that is only part of the learning landscape. As Diana Laurillard has written, "It is as absurd to try and solve the problems of education by giving people access to information as it would be to solve the housing problem by giving people access to bricks." Nevertheless, putting content online is the most developed area of instructional software.

Learning "how," ah, that's another story. Learning how implies engagement, visualization, and active participation. It is the area where technology is just getting to the point at which we can begin to work effectively. Work going on in the humanities in the use of rich media for narrative expression, inter-cultural communication, and interpretation of literature is one of the areas in the forefront. These activities demand infrastructure capable of handling large amounts of information, processing ability, and storage. This is more than just "large pipes," or high-bandwidth networks. Instead, it is in the province of middleware between applications and the fiber-optic cables connecting the network nodes.

Briefs

- A 2000 MIT Sloan graduate launched a Cambodia-based company to provide data entry and digitization services to western universities, companies, and non-profits. Jeremy Hockenstein hopes **Digital Divide Data** will bring the economic benefits of technology to poor countries.
- PeopleSoft awarded **Cal Poly Pomona** a gift of $5.3 million worth of PeopleSoft 8 software to be used in the curriculum and as an administrative tool.
- The **Association of American Medical Colleges** and **CollegeNet Inc.** will collaborate on technology to remove duplication in the processs of applying to medical schools.
- **Dell Computer** joined with a fabricated building company to offer "Cyberspaces," modular classrooms equipped with computer systems and peripherals.

For these and other news stories, or to subscribe to the weekly Syllabus e-News, Resources, and Trends, visit www.syllabus.com.

Much of technological progress revolves around making the complex invisible so that the next layer of development can proceed. You don't think twice about clicking on a hyperlink to bring a Web page to your screen, but the actions that must be successfully executed to accomplish this are remarkable. When we had to hand-code pages to present nicely formatted HTML, we were reminded of one small slice of that complexity. Now we click "save to HTML" and go on with our creative writing.

Grid Computing: The Next Big Thing

The next big thing to transform the Internet is likely to come from work going on with the grid. The grid is an infrastructure that enables flexible, secure, coordinated resource sharing among dynamic collections of people, institutions, and resources.

It may be useful to recall that the birth of the Web came from a desire to share research papers among large numbers of particle physicists doing "big science" at CERN, the Swiss research center. Tim Berners-Lee's vision has changed all our lives. In the world of international science, its impact has been staggering. Recognizing this, the Joint Information Systems Council (JISC), the UK analog of the National Science Foundation, has embarked on a £98 million project called the Core e-Science Programme, managed by the Engineering and Physical Science Research Council (EPSRC) on behalf of the UK Research Councils. The e-Science project proposes to connect scientists with expensive remote facilities, teraflop computers, and information resources stored in dedicated databases. Add to these resources higher level services such as workflow, transactions, data mining, and knowledge discovery, and you begin to glimpse what's envisioned. The grid is the architecture proposed to make this a reality.

What kinds of research are we talking about? Everything from particle physics (what goes around comes around) to basic medical investigation. For example, our understanding of even basic human physiology remains terribly limited. We don't know how multiple parameters interact over time in fundamental processes like heart rate, blood pressure, and other cardiovascular indicators. Imagine if 100,000 people volunteered to wear real-time monitoring devices so that their daily metabolic functions were recorded and analyzed in real time. The volume of data is enormous but that's just the beginning. We would want to compare how the data relate to the activities of the people as they went about their daily lives. In the end, predicting the likelihood of an impending physical problem becomes a potential reality. Just like the work underway to provide predictive intervention for the replacement of computing hardware, you can imagine high risk heart patients wearing proactive monitors that page them to head for a cardiac care unit because the data indicate a potential problem in the next 24 hours. Today it may seem like science fiction, but with research using the grid, it's emerging into possible science fact.

This may seem far a field from the classroom. How far it is remains to be seen of course, but there are people working today on applying the potential of the grid to learning management or virtual learning environments. Better descriptions about teaching processes and the learning objects needed, along with work on metadata for educational objects, are underway. So stay tuned for more about the "next big thing" in future columns.

REFERENCES

Laurillard, D. The Changing University. 1996. http://itech1.coe.uga.edu/itforum/paper13/paper13.html

Metadata for Education Group www.ukoln.ac.uk/metadata/education/regproj

Grid Links

Research Councils UK www.research-councils.ac.uk

UKERNA News www.ja.net/documents/UKERNA_News/2001/december/UKERNA_News17.html#15

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S: Are there any good, common, simple security measures?

JS: One of the things that has helped us improve security is Web-based applications. When they first came out with their browser, Netscape really jumped on the problem of how to provide a secure way to get from a browser to a server. And of course you know that today as SSL, the ubiquitous https and that little lock icon. And so in essence, Web browsers with built-in support for SSL gave us the generic security-capable desktop client. So I can build a secure application and not have to worry about getting a program out to everybody's desktop. If they use their browser, we're okay.

S: What's a good example of that?

JS: One of the things I would like to see is faculty filling out a Web form put up by the registrar's office and entering the data directly into a Web server through a secure channel—then, that data is really never exposed, and it is not left laying around on hard drives. Web-based technology gives us a real opportunity to integrate systems.

S: So you feel that the Web security is fine?

JS: Certainly. But you know, the devil is in the details. With SSL, which is a standard and widely deployed, it is certainly the case that when you enter, for example, your credit card information into a secure page and it is sent over the network, no one is going to be in a position to steal it; however, once it gets onto the server at the bookstore, or wherever it may go, the question becomes how well protected that server is. I become nervous when I see a small shop that isn't very security-savvy set up what they think is a secure Web site—well yes, in transit it's secure, but do they really understand security at their database level? If you're a very large organization and your business depends on the Web, then you're motivated to make it secure. And it probably will be. But there's probably some gray area in between those two extremes that a lot of schools would fall into, and their security could probably be improved.

S: Then there could be problems on either end of a transaction, even when a secure, standard technology is being used between the two sides?

JS: Yes, and another thing to remember is that security is a negative deliverable. You don't know when you have it. You only know when you've lost it. If I have to integrate two systems together, and I don't get my standards right for the actual data formats, then the systems don't work and that's obvious to me and I have to fix it. But if I have two systems talking to each other, but in a totally insecure way, the technology still works. The application still runs. Everything works like it should until somebody steals the data.

S: What's going to motivate campuses to provide really good security?

JS: When I sit down in conversation with other people in higher education, the concern over student records eventually is traced to the FERPA Act, also known as the Buckley amendment, and so there's a feeling that in order to meet the legislation, we have to be providing the required level of service. But some universities also have a very strong sense of privacy and don't want the privacy of their students compromised; therefore they don't want student records compromised. I can't say that it's universally true that there's belief in the privacy of students, but certainly it's there in many cases. There's also the fear of loss of reputation. Nobody in the IT business wants to be the CIO of the university that gets written up in the *New York Times* because they had some breach of privacy.

S: So if reputation is a factor, should good security be one of a potential student's criteria when selecting a college?

JS: Well, let me quote Tom Peters. He said that no one chooses a university based on the quality of its administration. And I don't think anybody has ever said to me, "Jeff, I'm thinking about going to MIT, but I'm really concerned about the security of your administrative systems and whether they're good enough." It just doesn't come up.

S: Are biometrics going to be used soon for normal security in higher education environments?

JS: Biometrics, I think, are farther out than most people think they are. For example, one of the primary benefits to the user of a biometric authentication is that you don't have present anything but your body. But the way we see a lot of biometric systems deployed, you actually have to have an ID card *and* you have to look at the iris scanner or use the fingerprint reader. Keep in mind that today, we have a lot of people just entering a user name and a password over a secure Web login, and that's working just fine in higher education. If you say that now, you also have to have a card, never mind the biometric, that's just going to be a step up in inconvenience. I think eventually the push for biometrics in higher education will be one to improve user convenience, which is to say not to require you to memorize a password or carry a card.

By the way, here's a little story. I was talking to a vendor of a fingerprint reader that was being designed for use on cash machines, and I said to the him, "You know, I don't really want it to be the case that the only thing you need to get in to my bank account is to have my finger." He got just what I meant and said, "Oh don't worry. The reader can tell whether the finger is alive or dead." I responded, "That's not the point! My finger is much more valuable to me than anything in my bank account." But then he said, "Well, you don't have to worry because I've explained it to you, so now you know that it won't do any good—so you're safe." I protested, "No, that's not true. You don't have to convince me that a dead finger doesn't work. You've got to convince the crackhead whose going try to cut my finger off!"

S: What's going to be important for security in the future, say, in the next five years?

JS: The most important question is about how we can get security technology more broadly defined, deployed, and accepted. Part of the answer is that we've got to make the security technology that we develop be user friendly and incrementally deployable. And what I mean by incrementally deployable is that we have to be able to roll it out on a per student or per department basis, or maybe on a per school basis, but we can't create a security technology that nobody has one day, and the next day, everybody has to have all at once. We call that a "flag day," and you just can't do that. So we've got to come up with strategies to get security technology incrementally deployed. And it's got to be cost effective. It's hard enough to get students, administrators, and faculty to understand the value of security. If you assign a very high cost to it, they're just going to walk away. So we've got to come up with easy to use, cost effective, and incrementally deployable technologies. That's our challenge.

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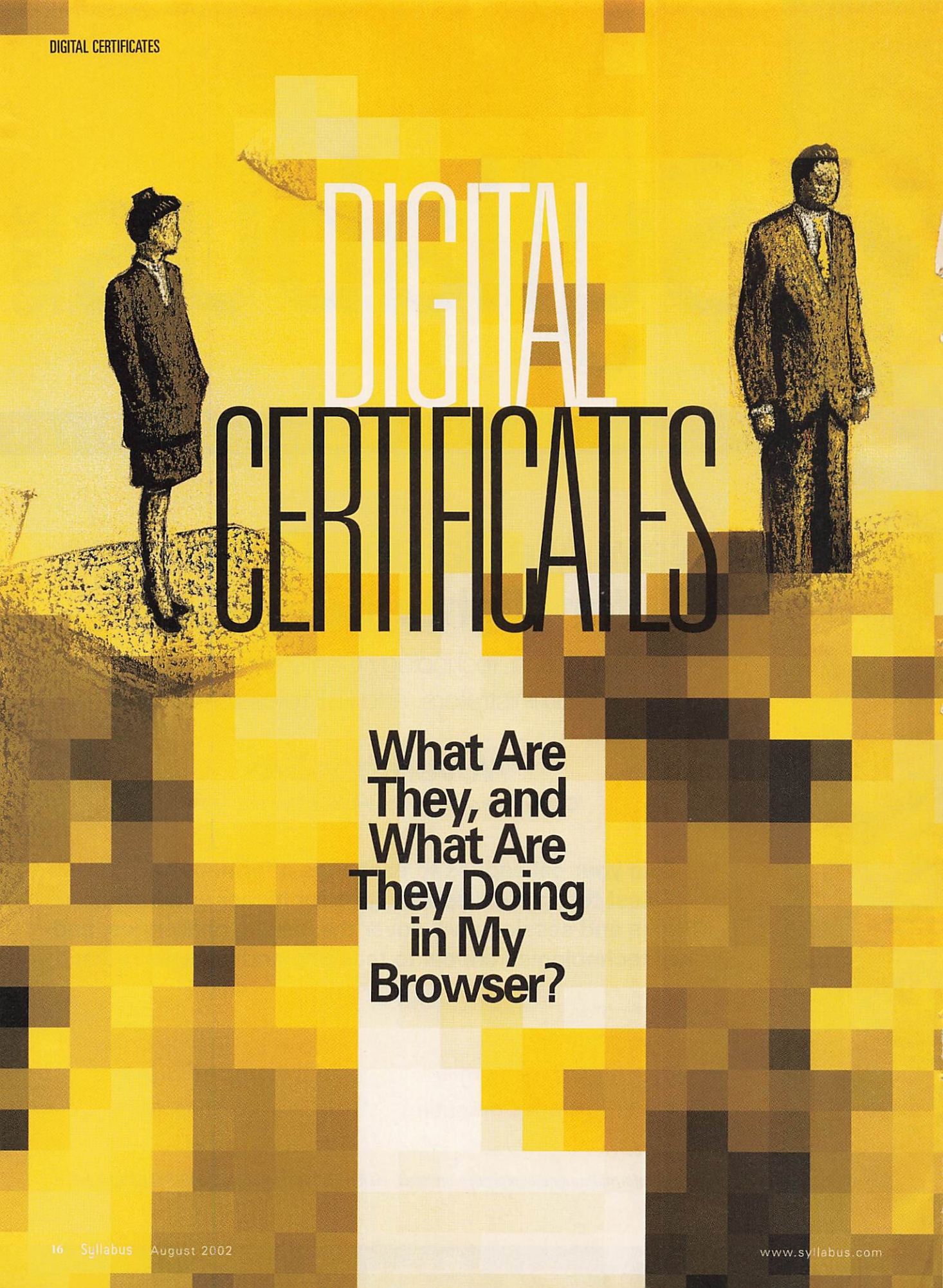


DIGITAL CERTIFICATES

What Are They, and What Are They Doing in My Browser?

Digital certificates provide a means to authenticate individuals and secure communications on campus. CREN now offers an easy way for institutions to learn about and deploy this powerful technology.

By Judith V. Boettcher and Amanda Powell, CREN

Did you know that you have a cache of digital certificates in your Web browser? In fact, you probably have more than 60 digital certificates that come preinstalled in the Netscape and Internet Explorer browsers. These certificates are from vendors such as VeriSign, Entrust, and Baltimore. Your Web browser uses them to access Web sites—without your even being aware of the presence of the certificates.

Digital Certificates versus Electronic Signatures

In 2000, the 106th Congress passed Bill S. 761, the Electronic Signatures in National and Global Commerce Act (see http://thomas.loc.gov). By passing this act, Congress launched a new age for the use of digital technologies for authentication and authorization. For example, this act authorized businesses—and the government—to operate on an electronic basis, enabling important documents to become legally binding with the use of a digital signature.

The act left the definition of an electronic signature deliberately ambiguous. Some applications interpret a digital signature as being a digital image of one's penned signature, the signature you provide as you sign for credit card purchases in department stores. Another set of technologies for electronic signatures create digital certificates that are issued by a trusted organization that is part of a public key infrastructure (PKI).

Public Key Infrastructures and Certificate Authorities

Digital certificates are the core of a public key infrastructure (PKI). A PKI includes organizations called *certification authorities* that issue, manage, and revoke digital certificates; organizations called *relying parties* who use the certificates as indicators of authentication; and *clients* who request, manage, and use certificates. Examples of certification authorities include VeriSign, a well-known commercial provider, and the CREN Certificate Authority that is available for higher education institutions.

Types of Certificates

It is easy to get confused about digital certificates, as there are different types of certificates, each with different functions. It helps to differentiate among at least four types of certificates. You can see samples of some of these different types of certificates in your browser.

- Root or authority certificates. These are self-signed certificates that create the base (or root) of a certification authority, such as Thawte, or CREN.
- Institutional certificates. These certificates are also called campus certificates. They are signed by a third party verifying the authenticity of a campus authority. Campuses then use their "authority" to issue client certificates for faculty, staff, and students.
- Client certificates. These are also known as end-entity certificates, individual certificates, or personal certificates.
- Web server certificates. These certificates are used to secure Web communications to and from servers and are also called server-side certificates.

Digital Certificates in Higher Education

The broadest use of digital certificates on campuses is Web server certificates. These certificates enable the encrypting of communications to and from Web servers to protect sensitive personal information, such as credit card and other financial or health information.

Individuals use digital certificates for two main purposes: (1) to authenticate themselves to a Web service or to a network resource and (2) to sign and, if desired, to encrypt e-mail. For example, higher education institutions are designing campus systems to use digital certificates for authenticating individuals for Web services

such as updating personal information files; for viewing grades and financial status; for course registrations, residence lotteries, business services, and voting; and for remote access to resources, such as class material or health services. Electronic mail for general use as well as for the submission of timesheets, travel reports, and service orders is another application which benefits greatly by the use of PKI and the more approachable PKI-Lite.

The added value of digital certificates is that they provide a higher level of security than what we currently have with PIN and password combinations. Users still use passwords, but in combination with the digital certificates. So, if one loses the device on which a digital certificate is stored, a person who might obtain the certificate would also need the password in order to use the certificate. Digital certificate technologies also support the desire on many campuses to create single sign-on authentication and authorization systems that reduce the need for the multiple sign-ons (and password combinations) that are inevitably hard to manage. With just a little experience, users can easily manage their digital certificates within their browser or with another application.

Getting Hands-On with Certificates

To see the certificates in your browser, including some you may have unwittingly installed yourself, you can go to the Preferences menu in Netscape/Windows, and from the Privacy and Security Menu, select the Certificates option. From this option, you can manage the Authorities certificates that come preinstalled in your browser and also manage your personal certificates. You can view, edit privileges, or even delete certificates.

You can also view and manage certificates within Internet Explorer/Windows by selecting Internet Options from the Tools menu and then choosing Content. Then, by selecting Certificates, you can manage your Trusted Root Certificates as well as your personal certificates. In Netscape/Mac, just select the Security icon.

Getting Started with Digital Certificates

Digital certificates within the PKI infrastructure are a broadly enabling technology. This means that once the technology is deployed, it is usually widely adopted. Some of the campuses that are deploying digital certificates include Columbia, MIT, and the University of Texas-Houston. Other institutions that are planning for deployment include the University of Minnesota, Dartmouth, Georgia Tech, and the University of California system.

As PKI is a comprehensive technology, use of client digital certificates on campus is usually not for only one or two applications. Institutionalizing the use of digital certificates on campus for faculty, staff, and students in general is done at the central IT level.

How Do Digital Certificates Work?

Digital certificates have been described as virtual credit cards. This is a useful analogy. Here are some of the ways that digital certificates and credit cards really are the same: Both credit cards and client digital certificates contain information about you, such as your name and information about the organization that issued the certificate or card to you.

Credit card organizations generally "validate" you to ensure that you can be trusted to be financially responsible. Similarly, campus organizations generally issue institutional identity cards, after ensuring or validating that you are a bona fide student, faculty, or staff member. In PKI terms, this is called the registration process—verifying that you are you, after which the campus organization would approve a digital certificate to be issued to you.

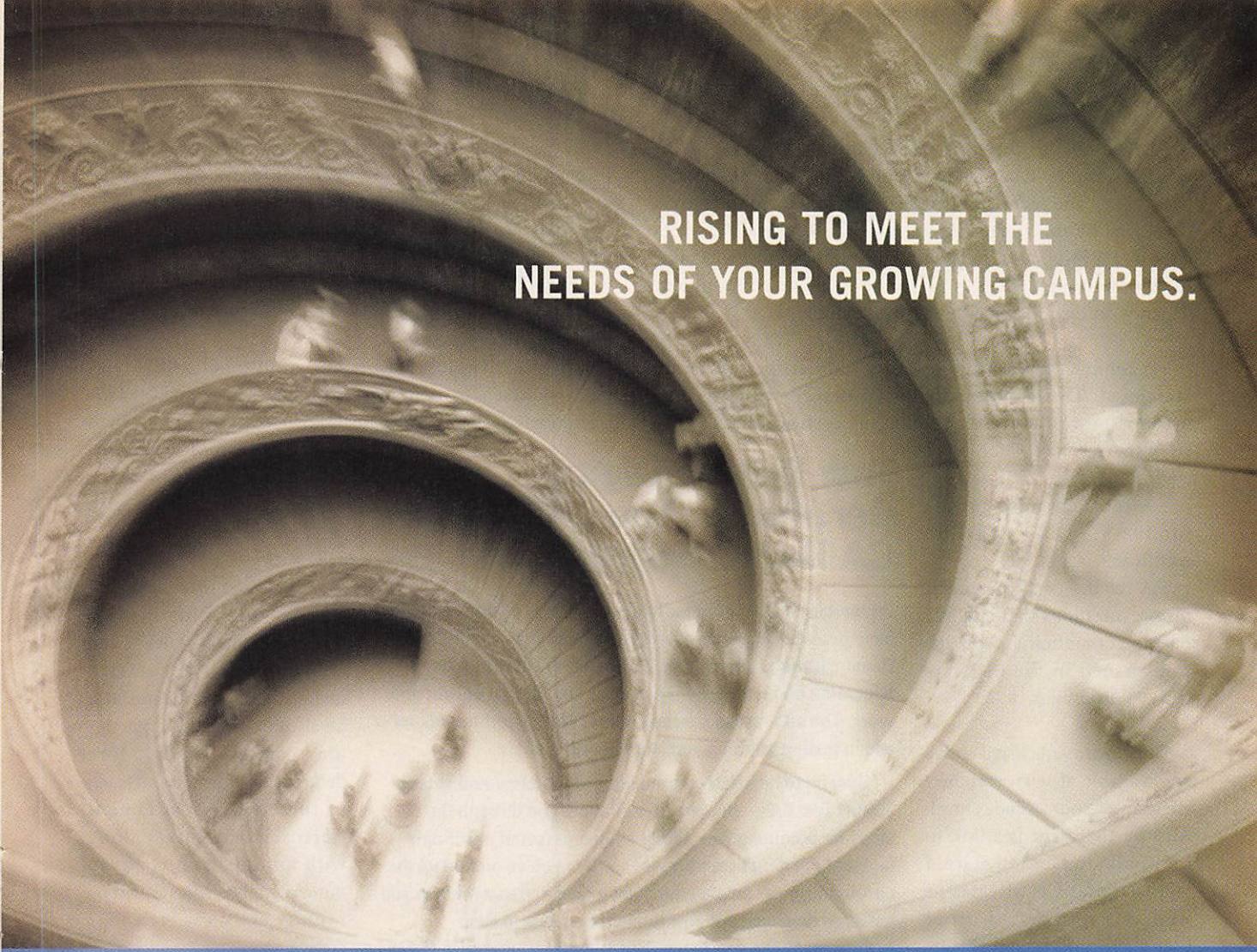
Similar to a credit card, once a digital certificate is issued, it should be managed with care. How is this done? In creating digital certificates an application generates a unique key pair that contains two parts, a public key and a private key. Then the certification authority—generally on your campus—creates a digital certificate by wrapping information about you and the organization around that public key and signing it.

In PKI terms, the public key for an individual is put into a digital document that is signed by the organization's certification authority. It is the private key portion of the original key pair that must be securely managed. As the private key is a long set of alphanumeric characters, it is not something an individual memorizes; rather, the private key must be stored on some device, such as a laptop computer, PDA, or USB key ring.

To see an actual certificate, you can go to www.cren.net/crenca/caeventarpages/new_root.html. This is the root certificate of the CREN CA. A root authority certificate is a special kind of certificate that is self-signed and often serves as the root of a hierarchy of other certificate authorities within a community. When a certificate is self-signed, it means that the name in the Issuer field is the same as the name in the Subject Field.

PKI-Lite for Higher Education Community

Members of the higher education information technology community announced the creation of the PKI-Lite trust environment in late 2001. The PKI-Lite trust environment is designed to lower the barriers for the deployment of digital certificates on campuses. PKI and digital certificates can fairly easily bring improved security to campus communications and services. However, the PKI trust environment for financial purposes and some federal government applications had made PKI—in only one flavor—costly and complex to deploy. The PKI-Lite trust environment was developed as a means of supporting the use of digital certificates on campuses by matching the majority of campus application needs to the corresponding security and risk requirements.



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PKI-Lite is full-featured PKI technology deployed with existing campus standards for identification and authentication (I & A) and security. The PKI-Lite trust environment was developed by the Higher Education PKI Technical Activities Group (HEPKI-TAG) and the Higher Education PKI Policy Activities Group (HEPKI-PAG). The PKI-Lite environment depends on the following three trust documents:

- A combination Certificate Policy and Certificate Practice Statement. This combined CP/CPS describes the recommended best practices for a campus certificate authority to use for the PKI-Lite environment.
- A recommended profile for the x.509 v3 PKI-Lite certificates.
- A relying party statement for organizations that will rely on the authenticity of certificates issued in the PKI-Lite trust environment.

The documents listed above are available at www.cren.net/crenca/pkiresources/index.html. Also on that page is a link to the Guide to Getting Started With Digital Certificates as well as a number of other useful PKI and digital certificate knowledge resources.

The CREN Digital Certificate Services

CREN currently offers an expanded set of certificate authority services to higher education institutions.

- CREN-signed campus certificates for institutions. These CREN-signed certificates are for institutions issuing certificates for their campus community—in the range of 10 or more Web server certificates and for more than 500-1,000 client certificates.
- CREN Web server certificates. These certificates are for campuses to use for securing Web servers, supporting a range of campus Web applications.
- Client certificates. CREN has an internal CREN.NET service equivalent to a campus certificate-issuing application. A registration contact at a campus validates/approves individuals and CREN issues the certificates. These certificates can be used to communicate with vendors, agencies, and so on.

With these three levels of service—including the free test certificates—CREN can help campuses get started using digital certificates at a level matching their particular campus needs. More detailed descriptions of each of these CREN CA Digital Certificate Services, along with an opportunity to try out a digital certificate, can be found at www.cren.net/crenca.

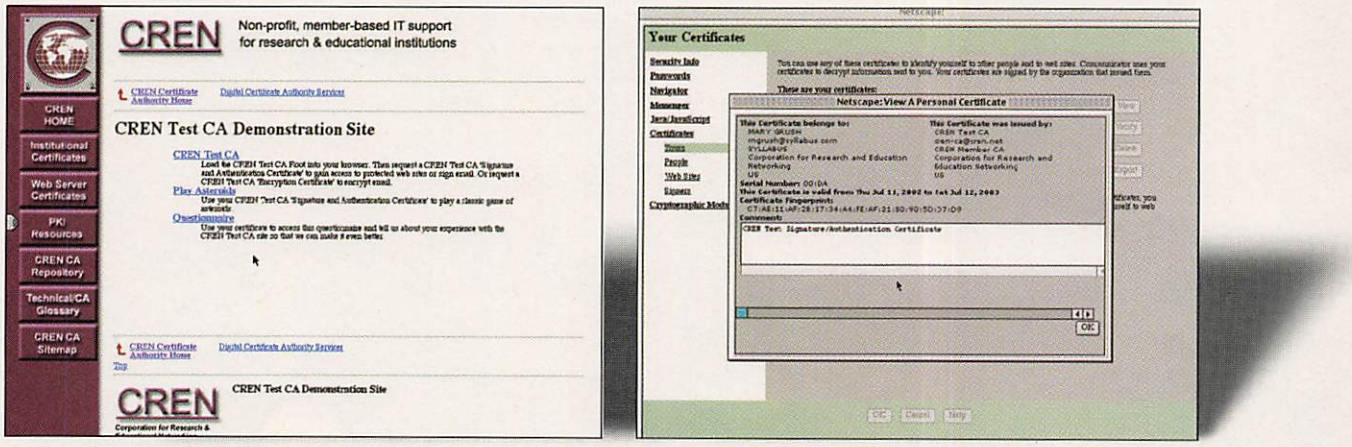
Judith Boettcher is the executive director of CREN and can be reached at ***jboettch@cren.net****. Amanda Powell is the membership communications manager at CREN and can be e-mailed at* ***apowell@cren.net****.*

Test Drive a Digital Certificate: The CREN Test CA Demonstration Site

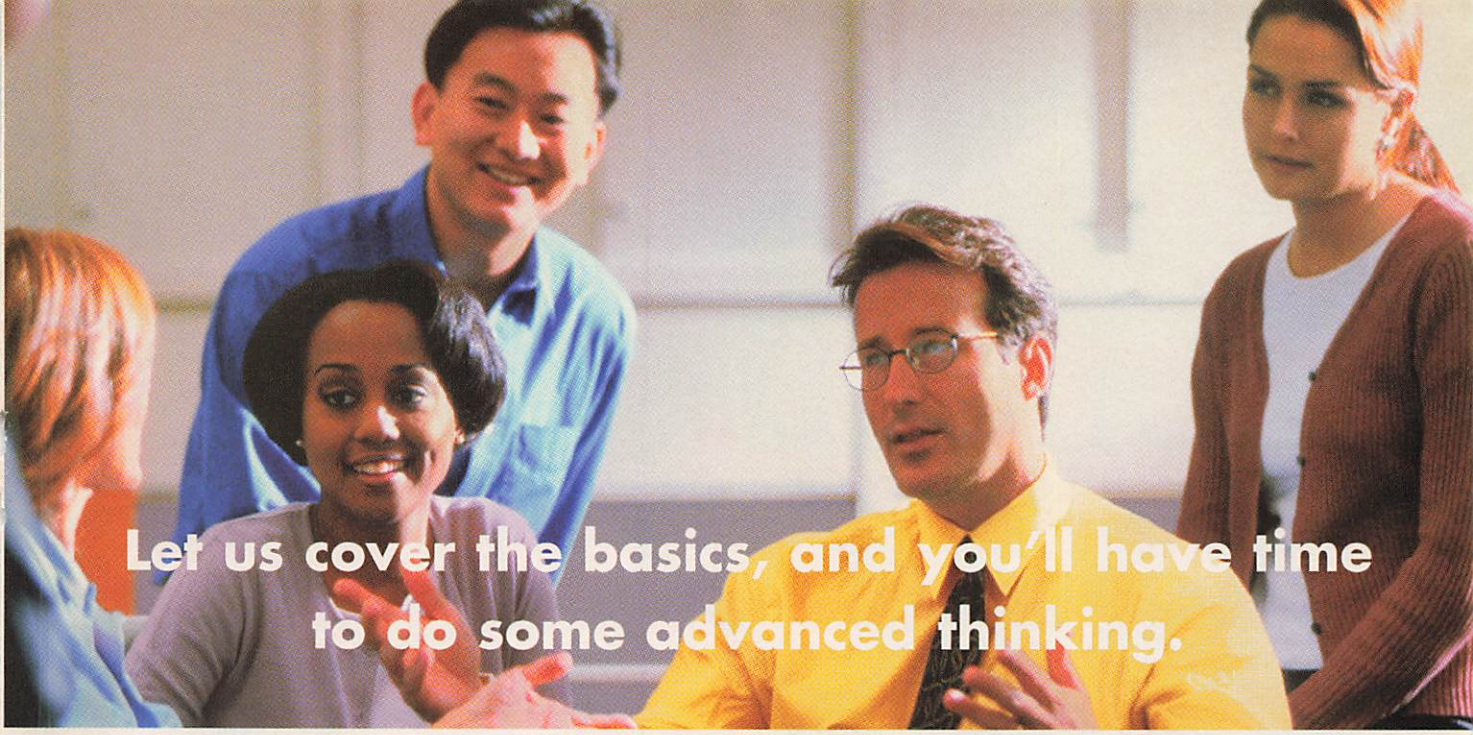
Understanding new technologies is always easier when you have personal experience with a technology. The CREN Test Demonstration site is a place for members of the higher education community to experience how digital certificates work. The site issues personal client digital certificates for use in testing, piloting, and educational uses.

Just go to http://www.cren.net/crenca/ctca/ and select "CREN Test CA"—the wizard will walk you through the steps for obtaining your CREN-signed personal certificate and loading it into your browser. When you've picked up the certificate, you can play the classic game of asteroids to see how you can use your certificate for access to Web resources. When you're finished, please remember to leave feedback by using your certificate to access the online questionnaire. If you have any difficulty, simply e-mail digicert@cren.net.

The CREN Test CA Demonstration site was a collaborative project of John Douglass of Georgia Tech and Michelle Gildea, Arya Parsee, and Jim Reynolds of CREN.



The CREN Test CA Demonstration Site allows users to generate and experiment with digital certificates.



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Blended Threats

A New Risk to Academic Freedom

Rick Lesniak, University at Buffalo

The difficulties of balancing security and freedom are now under a national spotlight as a result of the terrorist attacks of September 11, but institutions of higher education have struggled with the problem for decades. Universities have always tried to maintain openness and experimentation in order to promote a credible environment for teaching, learning, and research. Of course, this doctrine is double-edged, because openness invites risk.

In the practical arena of computer science, this means knowing that when students write Common Gateway Interface, or CGI, scripts for university systems, they are creating well-known targets for malicious users. Also, students might be encouraged to use software probes to test systems, networks, and Web sites with the understanding that such utility programs are also widely exploited by hackers to uncover weaknesses.

Such challenges of balancing openness and security are often dangerously compounded at the level of system use and administration. For instance, systems are often improperly installed and configured by non-technical faculty and staff. Or, a departmental server might be informally administered by a faculty member or graduate student whose experience with computers is slight.

But even when properly configured, authorized systems can be troublesome. The growing diversity of operating systems from one school to another requires equal levels of expertise from already burdened technology support staff. Add to that the problems of limited budgets, transitory student populations, and inexperienced users, and achieving healthy checks on openness can become impracticable.

To exacerbate an already troubling security situation, Internet-based attacks have become more complicated, often combining multiple threats to extend or propagate the attack. These so-called blended threats demand a more comprehensive approach to security—one that replaces a "one threat, one cure" approach with a multilayered defense and response strategy.

A blended threat is malicious code that uses multiple methods to attack or propagate. Blended threats share a number of characteristics: They cause harm, they use more than one attack method, they are automated (requiring no user intervention), they exploit vulnerabilities, and they typically use several propagation methods.

Although blended threats differ in how they infect and spread through systems, all such threats can send the cost of lost productivity, cleanup, and recovery into the stratosphere. Recovering a single infected system can take an entire day, and the strain of repairing thousands of systems is formidable, even for the most efficient university security team.

Under the pressure of budget and time constraints, many universities often simply react to the latest threat. Security priorities are based on addressing current attacks rather than on preventing future problems. However, code remediation is the most costly and least efficient way to deal with security issues. Security must become a part of the operating business plan of a university, rather than an afterthought.

To that end, universities can take several steps to reduce their vulnerability to current and emerging security threats. An effective combination of best practices and technology should include the following components:

• Conduct an information campaign. An information campaign aimed at educating students, faculty, and staff about security threats and what those threats mean in behavioral terms can be highly effective in preventing security breaches. If users recognize unsafe practices, they are less likely to put their systems at risk. If they know what to do when their systems are compromised, they can prevent a serious problem from becoming a nightmare.

• Deploy antivirus software, intrusion-detection tools, and firewalls. Antivirus software on desktop computers, servers, and gateways protects against malicious code at its points of entry. Intrusion-detection software detects unauthorized activity and security breaches and, in some cases, can respond automatically. Firewalls control incoming and outgoing traffic, allowing only authorized activity across the university network. The University at Buffalo uses Norton AntiVirus from Symantec Corp. on all Microsoft Corp. Windows desktops and Microsoft Exchange Servers. As a result, both incoming and outgoing viruses—including script-based threats—are detected and either repaired or quarantined before they have an opportunity to spread. The university makes the software available to all students through its "Tech Tools" CD and secure download site.

• Keep apprised of security events. Internet security organizations such as the SANS Institute (www.sans.org) and the CERT Coordination Center (www.cert.org) provide current information on the latest national and international computer security incidents and threats. In addition, many vendors provide up-to-the-minute security advisories and assistance based on information gathered and analyzed by their own security experts.

• Identify and patch critical systems. Keeping operating systems and applications up-to-date with the latest security patches can prevent even the most sophisticated blended threats from compromising a university network. Vulnerability assessment software eases this process by automatically identifying unpatched systems.

• Remove unneeded services. Unneeded services are often installed by default; they are a security risk because the open port through which they communicate is commonly used by hackers and viruses. Vulnerability assessment software is useful in detecting such services. Administrators can also visit one of a growing number of Web sites that will scan their systems, pinpoint potential problems, and recommend repairs.

• Maintain system logs. Thorough system logs enable administrators to prevent future attacks by understanding past ones. In addition, if needed, system logs can give law enforcement officials the documentation they need to investigate security issues as outlined in the recently passed federal anti-terrorism legislation, the USA Patriot Act.

• Create a response team. Identify key individuals and the roles they will assume in the event of a security incident. Set aside a "war room" where the response team will meet to respond to an event. In addition, make sure appropriate non-IT communications tools are available, including phones and faxes.

As technology evolves and Internet use skyrockets, blended threats are likely to grow in frequency and complexity, increasing the likelihood of attacks at universities around the world.

But by capitalizing on today's security technologies, universities can begin to alleviate these risks and build a protected environment that allows openness, enhances learning, improves teaching, and advances research.

Rick Lesniak is director of Academic Services, Computing and Information Technology at the University at Buffalo.

Blended Havoc: Code Red and Nimda Worms

The Code Red and Nimda worms were blended threats. Unleashed in August and September 2001 respectively, these worms spread rapidly and caused a great deal of damage.

Nimda used four methods of propagation, including unpatched Microsoft Corp. Internet Information Server systems, e-mail, visits to compromised Web servers, and systems that had file-sharing enabled. It was written to find and exploit backdoors left by previous viruses, including Code Red. Nimda slowed and even stopped Web traffic for many users and generated excessive traffic at businesses and educational institutions around the world.

Research firm Computer Economics estimated that Nimda infected more than 2.2 million servers and PCs in a 24-hour period and caused more than half a billion dollars in damage.

Code Red launched denial-of-service attacks and defaced Web servers. Code Red II also left behind Trojan horses for later execution by worms such as Nimda. Because Code Red processed in memory rather than on a hard disk, and since it gave no outward indications of its presence, it went largely undetected.

The Code Red worm cost an estimated $2.6 billion, according to Computer Economics. The research firm calculated that more than $1 billion dollars was spent cleaning up 1 million infected servers and inspecting another 8 million related servers. The rest—approximately $1.5 billion—was lost to corporate downtime.

The message left by these two blended threats is clear: Single-point solutions are ineffective in thwarting complex, multileveled threats. Instead, organizations need to deploy security solutions that provide several layers of defense and response.

Illustrated by James Endicott

Sally M. Johnstone

As founding director of the Western Cooperative for Educational Telecommunications at the Western Interstate Commission for Higher Education, Sally M. Johnstone serves as a resource on higher education technology issues. She also serves on the board of the American Association for Higher Education, the U.S. Open University's Board of Governors, and the Advisory Panel for the Consortium for the Advancement of Private Higher Education.
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When Online Services Reflect Bad Policies

For years, students have been held captive by institutional policies and practices that have not been holistically designed. Students have been going from office to office on campus to get the advice of the only people who know how to fill out a financial aid form correctly for veterans, for example, or whether a course offered every third term is really the only one that can be used to fulfill a unique degree requirement.

When students first began working with institutions electronically, planners quickly realized that they would need to be able to collect tuition and fees online. They were also fairly fast to recognize that institutions needed Web sites that would enable students to easily find which courses they could take at a distance. Now they are realizing that there are a lot of other online services that students would like to have, but few have succeeded in providing them in a usable manner.

Distance learning students are rarely in a position to know exactly who they need to contact to solve a particular problem. But as they move through the system, they become very familiar with the inconsistencies and conflicts among the way separate services are made available.

As my colleague at the Western Cooperative for Educational Telecommunications, Pat Shea, tells me, planners at Kapi'olani Community College in Hawaii did not want their students to have to struggle with this confusion, so they are testing a new approach in an online pilot project. New "learning support services" will be available to pre-health and medical assisting students through a Web portal developed specifically for the college. The idea is to build a community of health sciences learners—from prospective students through alumni—who will help one another learn.

Several critical services are integrated, including orientation, admissions, academic advising, and tutoring. For example, a prospective student can find out about the eight medical programs available at Kapi'olani, receive advice on how to decide among them, and apply to a selected program. Once the student is admitted, she can customize her personal page, share documents with other students via their projects pages, and receive and share information through bulletin boards and news groups. One section features several calendars: institution, program, and student activity, along with a dining calendar to entice students to meet socially for lunch.

Through the Web portal, students can find financial aid designed specifically for learners in the medical programs as well as links to the aid available through the campus financial aid office. They can also link to library learning resources that support their required courses. In addition, they can participate in assessments of their skills and get online-tutoring modules designed to address their weaknesses.

Academic advisers are available both via e-mail and in a chat room at times published on the portal. Future plans call for making portions of the portal public and encouraging medical personnel and consumers of medical services to use it to seek and supply information pertinent to the medical programs.

By designing services for online access from the student's point of view—and especially by using a holistic, integrated approach—many policy and procedural issues within the campus can be addressed. Just as integrating technological tools into the teaching and learning process has forced a re-examination of policies and practices in the classroom, so do these tools become an opportunity to re-think how the whole institution provides services to students.

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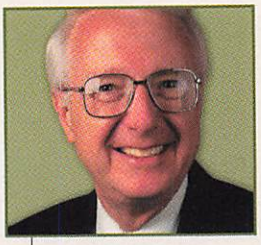


David G. Brown

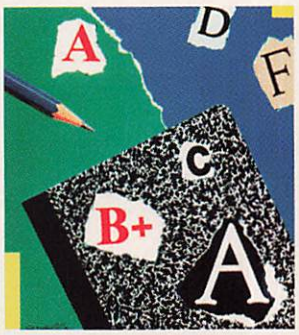
David G. Brown is vice president and dean of the International Center for Computer Enhanced Learning. He has served as president of Transylvania University, chancellor of the University of North Carolina at Asheville, and chair of several national groups, including the American Association for Higher Education and the Higher Education Colloquium. As provost of Wake Forest University, he founded the Annual Conference of Ubiquitous Computing Colleges and Universities, and founded the Journal of Computer-Enhanced Learning.
brown@wfu.edu

Please Learn From My Mistakes

I have come to the sad realization that many of the innovations designed to keep my course fresh have failed. My memories of failures are so poignant that it may be constructive to share them here. They can serve as warnings to others.

Unstructured chat room discussions don't work. Chats lack depth. Someone new is always interrupting the online conversation with his or her own topic just when the discussion is getting interesting.

Ungraded assignments are usually ignored. I used to ask two students to search the Web for two or three sites that provided alternative ways to learn the "topic of the day." They shared information on these sites in annotated bibliographies. An end-of-the-course evaluation, however, revealed that their classmates never went to these sites.



My current practice is to require each student to e-mail me with an evaluative comment regarding the sites. They know that their comments will factor into the participation portion of their course grades. A recent end-of-the-course evaluation now shows that the students regard the alternate Web sites as important and useful components of the course.

Personal e-mails can overwhelm. One semester, I asked all of my students to send me an e-mail answer to an assigned question each time we reached the end of a textbook chapter. The responsibility for reading and evaluating all those submissions just about ruined my family life. Now I have Student A e-mail a proposed answer to Students B and C. Students A, B, and C must settle on a single answer. They teach one another, and I have only one-third as much grading to do.

Students need to know in advance what their responsibilities are if the computer network goes down on the eve of an important deadline. Networks do go down. Students will panic, unless there are instructions in the syllabus that anticipate forgiveness or outline their alternatives.

Another semester, several weeks before the final, I accidentally deleted all my students' grades from the electronic grade book. Fortunately, the syllabus stressed that each student is expected to keep a copy of every assignment submitted and also of every grade-related message sent to him or her. With help from the class and substantial effort, I was able to reconstruct the gradebook. Now I print out a backup copy of grades about every two weeks.

I've come to realize that students accessing materials from course Web sites using a dial-up modem from a shared apartment off campus cannot, or will not, wait for long downloads. I had the bright—and well-received—idea of personalizing the list of course assignments. For each of our 34 assignment days I added thumbnail photos of the students responsible for presenting their special reports. Although student reaction to this personalization was quite positive, I noticed that they were consulting the list of assignments less frequently. A focus group session revealed that the list was now taking longer than a minute to open. Consulting the list was an increased burden.

My students bring their laptops to class everyday. Even so, I've learned that it's wise to exchange e-mail messages before class when anything out of the ordinary is to occur. If, for example, my plan for the day requires that every student have their computer, I send the class an e-mail message.

I suspect that others have made mistakes from which we can all learn. If you have a brief story you'd like me to share in a future column, please e-mail me. Let me know if it's OK to mention your name or if you'd prefer to remain anonymous.

Illustrated by Elan Cardella

Steven W. Gilbert

Steven W. Gilbert joined the American Association for Higher Education as director of technology projects in July 1993. He founded the TLT Group as the Teaching, Learning, and Technology Affiliate of AAHE in January 1998. He was previously vice president of EDUCOM, where he created and led the Educational Uses of Information Technology program and the EDUCOM Software Initiative. He also moderates the Internet Listserv TLT-SWG.
gilbert@tltgroup.org

Addressing the New Cost-Effectiveness

Every 10 years or so, the arrival of some new technology appears to capture and reproduce "lectures" at just the same time that college finances are suffering from new pressures to reduce costs while maintaining "quality." A few years later, most recognize that new technology, while helpful in many ways, does not replace traditional course activities the way pocket calculators replaced slide rules. Instead, through rapid adoption of new tools, widespread but modest experimentation, "low threshold" instructional applications are gradually and incrementally accepted. They really help more people teach more people to learn better!

Of course, "productivity" and "cost-effectiveness" are extremely difficult to define, achieve, or prove in higher education. Here are a few programs that appear, on their face, to be more obviously "cost-effective" than other approaches.

1. There are now several different successful programs that train students, provide technical support, and help faculty through the use of students to train other students and to develop students as supervisors and managers. These programs are often perceived by students as good educational experiences, opportunities to work more collegially with faculty and professional staff, and terrific career boosters. The dollar value of professional supervisory time and pay to student workers is dwarfed by the value of the technical support services provided.

2. Faculty members and professional staff can learn simple approaches to develop studies and to collect useful data about ways to use information technology to improve teaching and learning. New accreditation guidelines and standards, as well as external political forces, are increasing the need for coherent assessment and evaluation programs. Why not satisfy them and collect information at the same time that actually can help make things better?

3. There may never be widespread agreement in higher education for the best definition of "information literacy." However, recent work by the Association of College and Research Libraries provides an invaluable starting place. It is time to spread the skills necessary to take better advantage of the proliferating, complex, and messy information resource environment of the Web. Many librarians and many libraries are already transforming in ways that can help.

4. What are the functions a college or university should provide through its own staff and facilities? Even in these still-recessionary times, professionals in information technology-related fields can be difficult to afford, hire and retain. But established companies are offering new services to higher education, and new companies are springing up to fill this demand.

5. Educational resources and activities can now be more fully accessible to those with disabilities than ever before. Information technology can be part of the solution, instead of making problems worse. New levels of commitment to this kind of accessibility are now technological possible, ethically desirable, educationally valuable, and legally necessary.

A Moving Target

eLearning Vendors Take Aim in a Changing Environment

By Sharon Gray
Augustana College

Everyone knows that technology doesn't stand still. But eLearning companies are busily vying for their share of a very crowded market. How do you define this space? Frequent new product launches, company alliances, and changing interpretations of product categories may keep us guessing for some time to come.

The online learning product landscape is changing. Products are morphing into new "shapes"; companies are acquiring their competitors to expand functionality; users are finding themselves looking at learning management systems (LMS) that are enterprise resource planning (ERP) systems that are application service providers (ASP) that are community portals... and so on. Faculty who simply want to put courses or course components online have to wade through a host of available choices.

The labels can be confusing: course management systems, learning management systems, competency management systems, portals, Web-based instruction, collaboration tools.... To further complicate matters, one person's definition of any of these might be different from someone else's. What exactly is eLearning? What differentiates a learning management system from a course management system?

To help make sense of the eLearning landscape, we've taken a snapshot of today's market—a brief inventory of eLearning companies who offer products in four broad categories (see table, page 30). As a guide to understanding the product categories and related technologies, we've also provided a basic glossary (page 32) of current online learning labels, standards acronyms, and buzzwords.

Toward a Common Understanding

To encourage some common application of terms and functions, standards groups have been diligently working to develop standards for eLearning products. Ideally, these standards will allow for interoperability of eLearning components, such as quizzes and tests, content modules, and student records and data. Standards should allow users to share and manage their learning content and data regardless of the product with which the material was created.

For the purpose of our online learning product inventory, we use the term eLearning as a general, overarching category for online learning tools, products, and systems. The eLearning market space can best be described by outlining major functions. Below are some of the things eLearning

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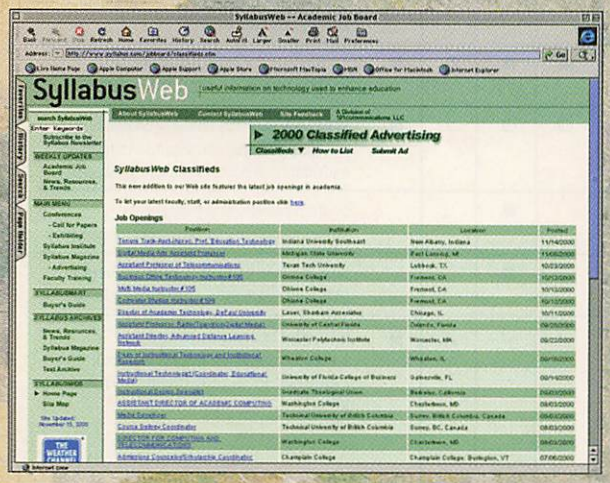

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101communications

products can do for teaching and learning. They allow instructors to:

- Organize and catalog learning resources for retrieval as needed by learners.
- Perform needs assessment of students' skills to determine possible areas for remediation and to provide a starting point for instruction.
- Present course material (text, graphics, and links to external sites and materials such as CD-ROM-and-textbook Web sites).
- Provide uniform training materials with single-point rollout and update them (instructors can more easily make changes to a single Web "workbook" than update numerous printed workbooks).
- Tailor delivery of course material to meet individual student needs.
- Track student progress through material.
- Provide anytime/anyplace access to course material. (An exception to this is synchronous communication, such as shared whiteboards, text or audio chat, and group browsing—all of which require that participants be logged in at the same time.)
- Relegate to an asynchronous environment items and tasks that can (and perhaps should) be done outside of class, thereby enhancing F2F class time.
- Create visually appealing interfaces to courses and training, allowing for branding.
- Evaluate student progress.

	Course Management System	Learning Management System	Portal	Turnkey	What they say about themselves...
ANGEL (CyberLearning Labs Inc.) www.cyberlearninglabs.com	■				helps educators manage course material and communicate quickly, easily, and effectively
Anlon Academic www.anlon.com		■			technology-enhanced campus courses in highly accelerated time frames
Aspen Enterprise Learning Platform (Click2Learn) www.click2learn.com		■			helps to deliver information, instruction, and performance support to employees, partners, and customers
Blackboard www.blackboard.com	■	■	■		enterprise software products and services that power a total e-Education Infrastructure
Campus Pipeline www.campuspipeline.com	❑	❑	■	■	software and services to help institutions of higher education direct and build their version of a unified digital campus
Convene www.convene.com		■			placing training, dynamic information, key documents and more into the right hands at the right moment
Collegis www.collegis.com	❑	❑	❑	■	comprehensive services to help colleges and universities manage their technology and provide focused, turnkey continuing education programs
eCollege.com www.ecollege.com	■	■	■	■	eCollege designs, builds, and supports high quality online degree, certificate/diploma and professional development programs for colleges, universities, school districts, and state departments of education
eSocrates www.esocrates.com		■			allows companies to leverage their employee knowledge to improve business processes, operational efficiency, and employee performance
eWebUniversity.com www.eWebUniversity.com	■	■	■	■	develops proprietary technology that enables and enhances...online learning
Education to Go www.educationtogo.com	❑	❑	❑	■	to provide students who are unable to access traditional classrooms with flexible and affordable courses of the highest quality
Educator (Ucompass.com) www.ucompass.com		■			content delivery and publishing, communication, and evaluation capabilities
Element K www.elemenk.com		■			best-in-class content, a state-of-the-art LMS and responsive, knowledgeable service
Embanet www.embanet.com	❑	❑	❑	■	integrator of scalable eLearning solutions...hosts Angel, Blackboard, First Class, IntraLearn, Prometheus, and WebCT

With products merging and vendors offering a myriad of services besides the simple delivery of learning materials online, back-end functionalities are becoming more prominent. In many cases, the true value of the new alliances cannot be fully realized unless an institution decides to wholly embrace a particular product or product line. Then the back-end functionality—ease of access, seamless integration with student records, smooth interface between tasks—can be fully appreciated.

To an individual instructor, the usefulness of many of the "new and improved" features may not be clearly apparent at first. As in the "olden days" of Web-based instruction (the mid-to-late 90s), it is again becoming important for instructors to communicate with their network administrators and academic administrators to help determine which products are truly going to provide a good return on investment.

While the instructors' needs may be simply for an online course manager, the back-end features (such as a smooth—perhaps even real-time—interface with the registrar's computing system, single log-in portal access for students to their financial and other records, and minimal IT maintenance and overhead) are all considerations that might impact which particular

	Course Management System	Learning Management System	Portal	Turnkey	What they say about themselves...
First Class (Centrinity) www.centrinity.com	■	■	■		enables educational institutions to improve overall communications and the collaborative process among educators, students, and the community
IntraLearn www.intralearn.com	■	■			combines the functionality of expensive LMS's into a single enterprise-class, field-configurable software application
Jenzabar www.jenzabar.com	■		■	■	single log-on entry point providing an intelligent, integrated, and Internet solution for your campus
JonesKnowledge.com www.jonesknowledge.com	❑	❑	❑	■	scalable, online course management and delivery platform, hosted on Jones' servers, with 24/7 technical support
LearnerWeb (MaxIT) www.maxit.com		■			automates the training management function
LearningSpace (Lotus) www.lotus.com	■		■	■	distance learning platform integrating live, asynchronous and self-paced content delivery
Mentorware www.mentorware.com		■			infrastructure support for the entire eLearning lifecycle
Southrock www.southrock.com		■			Web-based technology to manage the entire learning process
SCT www.sct.com	❑	❑	❑	■	end-to-end solutions that...support higher education's administration of teaching and learning
The Learning Manager (TLM Corp.) www.thelearningmanager.com		■			produce effective learning materials... deliver courses...monitor and manage learner progress
Theorix www.theorix.com		■			innovative Web-based content management and authoring system for non-programmers
Thinktanx (Viviance) www.viviance.com		■			authoring software...a comprehensive content management system and sophisticated learner management options
Top Class e-Learning Suite (WBT) www.wbtsystems.com	■	■			manages everything from the most basic level of Learning Objects to the highest level of organizational competency
Vcampus www.vcampus.com	❑	❑	❑	■	completely outsourced, remotely hosted and totally scalable distance education and training delivery solution
WBT Manager (Integrity eLearning) www.ielearning.com		■			designed exclusively to organize, deploy, and track Web-based training content
WebCT www.webct.com	■	■			state-of-the-art educational technology that supports a full range of teaching and learning styles and optimizes intellectual and technical resources

■ = produced by company ❑ = offered through a 3rd party

product or suite of products is best for deployment at a given institution.

Issues for Teaching and Administration Shape the Market

Administrators often see adoption of eLearning as potentially providing access to new or larger off-site markets. But, what they don't always realize is that online courses, at least the way they are created and delivered in most higher education environments, involve increased interactivity among faculty and students, resulting in increased workloads for faculty.

eLearning implementations may, in such cases, actually result in a potential reduction in the number of students that can be served effectively by an individual faculty member. And while such interactivity can arguably result in better learning, it does not necessarily result in cheaper learning. Finding an eLearning solution that efficiently integrates with existing back-end systems can minimize some of the additional workload.

How can instructors be creative with eLearning? To answer that question, it might help to first look at the more typical uses of eLearning products, such as consolidation of access to online resources (bibliographies, Web sites, journals, and articles), communication via e-mail, and discussion of course material asynchronously outside of F2F class time.

While these are certainly good uses of eLearning technology, there are those who are embracing the opportunity to rethink how they have traditionally taught material. In the process, they are coming up with creative ways of having students interact with the material that would not have been possible without eLearning.

They are designing courses that allow for specified release of information and learning modules based upon performance criteria: once a student has shown mastery of a particular topic, subsequent topics are automatically released.

Instructors are providing pre-F2F class preparation via self-tests and automated feedback. They are having individuals or groups search for Web sites and resources and create annotated Webliographies to share with others. They are creating collaborative environments for learners, utilizing one or more features such as synchronous application and document sharing, group browsing with audio voice-over, whiteboards, and two-way audio and video.

The accompanying eLearning inventory may help you appreciate the evolving nature of eLearning. It includes 30 of the current eLearning players. It is not an inclusive list, and it does not reflect endorsement of particular products.

The program has been in place since 2000. More than 250 students across the state of Texas have completed modules. The program is being adopted beyond Texas to other states and to institutions in Brazil. University of Texas at Brownsville and Texas Southmost College have adopted the curriculum to train local workers and those transitioning into the workforce.

According to Jackson, the program has spread via the grass-roots enthusiasm of those who have been exposed to it.

"Word has gotten out," she says, about the program's success. Officials at ELT Labs point to EnterTech's impressive outcomes: higher GED completion rates and an increase in community college enrollment among its graduates.

Many EnterTech grads credit the program for their salary increases and promotions. More than 67 percent of EnterTech graduates found jobs or enrolled in future education. This success rate, says Cavalli, matches those of four-year schools. "That a computer program can achieve this is amazing," he says.

For more information, contact ELT Labs, Austin, Texas, at (512) 482-0273 or www.entertech.org.

Education Technology Consortium

Academic and Technocrat Collaboration

By Ben Vasta and Dominique Monolesc

Imagine a scenario where faculty members could directly influence building a platform that delivered online courses to students and where they were not intimidated by technology, but living the mantra they most frequently utter: "Technology is merely the means for delivering online courses. It should not be an obstacle to teaching the course."

That scenario has become a working principle of the Education Technology Consortium, which for the past five years has been an incubator for educational technology produced with the active guidance of power users in the academic commuinity.

The consortium began as a partnership of community colleges in southeastern Pennsylvania, Delaware, and southern New Jersey for the purpose of broadcasting video courses over WHYY, the local PBS affiliate. Gradually, four-year colleges and universities joined the group, partly to tap into the course delivery services and partly to capitalize on the educational technology being developed within the group.

The catalyst for product development was a partnership between the consortium and WebStudy Inc., a local software developer that produced a course management system platform. Through their association with the consortium, the members gained both an entree into the online world and a series of enhancements to the platform as they became available.

The new consortium clicked. From its inception, WebStudy was positioned as an "application service provider." Incorporated into its mission was a philosophy of support and platform enhancement that includes provider input at every stage. One of the most basic illustrations of this approach were monthly user meetings attended by both distance learning administrators and faculty of colleges within the consortium. At the meetings, hosted by Curt Corbi, WebStudy's chief technology officer, college officials were invited to offer suggestions to enhance the platform and were kept apprised of the results of the beta testing of previous recommendations.

With the collaboration of faculty members, administrators, and Web developers, WebStudy was able to avoid a "one size fits all" approach to product development. In addition, other projects and enhancements grew from the user meetings, including faculty initiatives to publish training materials in print and CD formats for both faculty and student users.

Beta testing is spread among the consortium members to give as many colleges as possible a sense of platform ownership. Through this process, the latest version of WebStudy (Version 5.1) contains 31 new features, all of which were originally suggested by consortium members. Areas of the platform upgraded through this process include the e-mail system, the grade book, and the testing, calendar, and assignment page features.

Education Technology Consortium Members

- Camden County College
- Community College of Philadelphia
- Delaware County College
- Temple University
- University of the Sciences in Philadelphia
- Ursinus College
- Widner University
- WHYY
- WebStudy Inc.

In an interview, Corbi described the relationship between WebStudy and the colleges: "WebStudy's evolution from its inaugural release in 1996 to the current release has been heavily influenced by frequent, well-orchestrated interaction and feedback from the consortium of colleges and universities using it. Monthly meetings attended by academia, WebStudy, and WHYY... produce a 'secret sauce' that brings product loyalty to a new level.

"Functionality suggested by professors and students, technology innovations offered by WHYY, and skills in human interface design offered by

WebStudy's designers and programmers have been combined to create a tool that is intuitive and powerful—allowing quick course creation and ease of course delivery."

Temple University Professor Donald Heller, who teaches an online course on "Communication in Organizations," said the platform "offers a range of services that enhance the online experience for the students, including the live chat and forum sections. From a faculty member point of view, it is rewarding to be able to enrich student learning and participation with the course online tools offered by WebStudy."

Gisela Gil, a teaching assistant at Temple's School of Communications and Theater, has helped faculty members and students work with course management tools adopted by the university.

Says Gil: "In general, students seem to find WebStudy more versatile and 'warmer' than other platforms they have used. With WebStudy's latest version, students are better able to figure out its functions by themselves."

She added that WebStudy's "voice mail" was a promising feature: "The possibility of recording 10 minute messages provides a great opportunity for rescuing the instructor's role as a storyteller in online learning environments."

The struggles inherent in the collaboration have challenged not only the academics, but the commerical partners. Gisele Larose, president of WebStudy, said the experience of collaborative development conveys "what it is like to live in an academic world. The corporate world can appear like another planet sometimes.... It takes a willingness to get in the customers' world to succeed at building relationships and serving your customer."

Ben Vasta (svasta@camdencc.edu) is director of Camden County College's Distance Learning Program and chairman of the Education Technology Consortium. Dominique Monolescu (dominiq@temple.edu) is interim director of Temple University's OnLine Learning Program.

Illustrated by Robin Jareaux

Louisiana State University

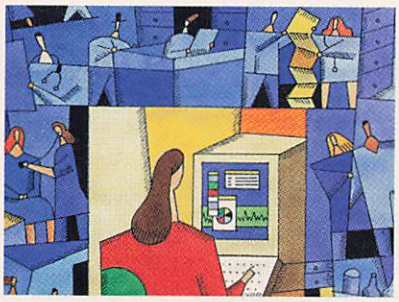
Nursing Faculty to Online Health

By Jennifer S. Couvillon, Cristina C. Hendrix, and Barbara C. Donlon

Although plenty of anecdotal information is available on students' perspectives on online education, information on how to manage faculty members' transition to online instruction is scarce, especially for professional schools and small colleges and universities.

To be able to effectively offer courses online, a faculty must be both inspired and guided. Unfortunately, technology is often installed before an understanding of the system itself occurs.

At Louisiana State University, the School of Nursing tacked this problem, aiming to maintain high standards of teaching while moving toward next generation learning resources, such as online teaching software and World Wide Web applications.



As a first step, course objectives on using the Internet were incorporated into syllabi in all academic levels. Two major projects were started to ease the use of the Web in course instruction: First, an online teaching application was purchased from WebCT. Second, a Distance Education Committee (DEC) was established, composed of the Associate Dean for Community Services, the top computer support person, and volunteer faculty members.

The DEC's main task was twofold: to develop strategies to support faculty in online teaching, and to recommend policies related to distance education. The DEC meets every month and invites all department heads to share insights into how the transition is progressing. The DEC also remains in close contact with the Curriculum and Education committees of the school.

The school's computer staff also provided a series of volunteer workshops to introduce the faculty to WebCT and its features. The faculty started sharing their experiences as the first WebCT course was offered. The administration, aware that hiring a full-time Web master would ease the technical difficulty of putting courses online, is now studying the financial requirements of adding the position. In the interim, the Associate Dean for Academic Affairs has reallocated teaching responsibilities for two faculty members to become Web facilitators for the faculty.

Information identifying a faculty member's needs in going online is generally scarce. That's partly because each school uses different technology, but also because the technology itself is often changing rapidly. In its case, the School of Nursing began by identifying the most pressing needs of its faculty before they could make the transition to online. This was to get them acquainted on how WebCT works, to have hands-on experience on how to upload courses on WebCT, and to have a resource center where faculty could easily seek out information about online teaching.

It was also important that faculty be aware of the need to reformat their course structure if they wished to involve the Internet in their teaching. At the onset, we discouraged faculty from merely uploading their courses on the Web without first determining if their course objectives would be affected.

Reactions from the faculty to online teaching have been mixed. Some approached the use of technology as a waste of time and resources. Others looked at it as a challenge. They were willing to spend time and energy to place their courses online. Still others hoped someone else would take full responsi-

bility. We have observed, however, that a faculty member's individual reaction is often directly related to their knowledge of computer usage.

There are several steps involved in converting files to HTML and uploading them to WebCT, all of which requires a good deal of time. Because of this, the faculty has constantly asked to have a Web master in the school. While it is prudent to have a technical person on standby, this should not stall efforts to use the Web as a medium for instruction. At LSU, the technical staff has agreed to be Web facilitators temporarily to assist faculty in their transition to online teaching.

The use of the Web in course instruction presents a special challenge to nursing, which is considered a practice discipline. Many of the faculty may be resistant, or even reluctant, to adopt this technology because of a belief that practice disciplines entail teaching skills rather than knowledge. However, creative ways can be devised to allow the practice component of nursing to be assumed by collaborating with nurses in the community where students reside. This is one option that may be elaborated on further should a school decide to incorporate courses that are entirely Web-based.

Introducing new teaching strategies is a major challenge that affects everyone. Since classroom teaching has been long accepted as the "norm" for instruction, there will be resistance as soon as changes are introduced. It will take time to integrate these changes within a pedagogical method. But with time, the benefits of using the Internet in course instruction will speak for itself. Based on the experience of the School of Nursing, a successful transition in online teaching must include constant communication, prompt assistance, and empathy when assisting a faculty member with this new task.

Jennifer Couvillon, Ph.D., FNP, RN (jcouvi@lsuhsc.edu), is an instructor of nursing; Cristina C. Hendrix, DNS, CFNP (CHendr@lsuhsc.edu), is an instructor of nursing; and Barbara Donlon, Ed.D., RN (BDonlo@lsuhsc.edu), is a professor of nursing at Louisiana State University Health Science Center.

Strategies for Training Online Faculty

1. Workshop

A series of three one-hour WebCT workshops were offered to all faculty. To allow hands-on experience, all workshops were offered in the computer lab. To accommodate as many faculty as possible, each series was offered both in the morning and afternoon.

Each attendee was given access to a WebCT course so that they could orient themselves and manipulate its features. The workshops were designed so that the first one was simple to understand and only talked about the general features of WebCT. The third workshop of the series required them to perform hands-on exercises, such as uploading PowerPoint files to WebCT and participating in threaded discussions. All attendees were provided packets that contained instructions on every exercise that was performed. Articles dealing with pedagogical principles in online instruction were also shared. On the last of the series, two of the faculty members most experienced on WebCT were asked to give advice on how to facilitate online instruction and to avoid pitfalls when using WebCT.

2. Help Page

A personalized WebCT Help desk was developed to offer faculty assistance with commonly performed WebCT tasks. It was titled, "Learning How to Use WebCT", and is available to all faculty once they access their WebCT. The Help Page contains workshop handouts as well as updated information on WebCT and distance learning. In addition, faculty were told WebCT also offers support in its help center. WebCT's monthly newsletter is also circulated via e-mail to all faculty who are involved in WebCT.

3. Brown Bag

After the workshops were offered and the WebCT Help page was created, an hour was allotted every month for informal faculty meetings to share experiences using WebCT. The main goal of the brown bag lunches was to provide a forum for faculty to communicate best practices for teaching online.

4. Individual Support

Individual support was provided to faculty who sought assistance. While some faculty chose to meet in their personal office space, others chose to e-mail or telephone questions as they arose. The faculty's perceptions of individual assistance were varied, as some expected the technical team would upload and design courses they were teaching. Others understood individual assistance was only for troubleshooting. The Associate Dean for Community Services handled requests of individual assistance to ensure each faculty-support person did not have too much scheduled at one time. A tally was created for the hours devoted to individual faculty assistance, which will be evaluated at the end of the school year to decide whether to adjust the number of support people.

5. Distance Education E-mail Communique

A distance education e-mail communiqué was attempted to update faculty on interesting points about distance learning. Resources included nursing, technology and education journals as well as professional organizations, including the U.S. Department of Education, Distance Education at Postsecondary Education Institutions, Accrediting Commission of the Distance Education and Training Council, the American Association of Colleges of Nursing, and the American Nurses Association.

6. Web Library

A distance education library was also created in the School of Nursing. It consists of resources and references on distance education in nursing, and includes a copy of the WebCT series workshop handouts. The Web library has a number professional policy reports on distance education, including the National Association of State Boards of Education's policy on e- learning, the National Center for Education Statistics Report on Higher Ed and Technology, and the Regional Accreditations Commission report for evaluation of electronically offered degree and certificate programs.

Vanderbilt Medical Center

Tracking Patients, Costs Wirelessly

Each year physicians at Vanderbilt University Medical Center in Nashville, Tennessee, treat 32,000 inpatient admissions in its hospitals and more than 800,000 adult and pediatric patients in its outpatient clinics. On such a scale, even small improvements in processing and tracking patients through the hospital system can yield huge gains in efficiency and financial performance.

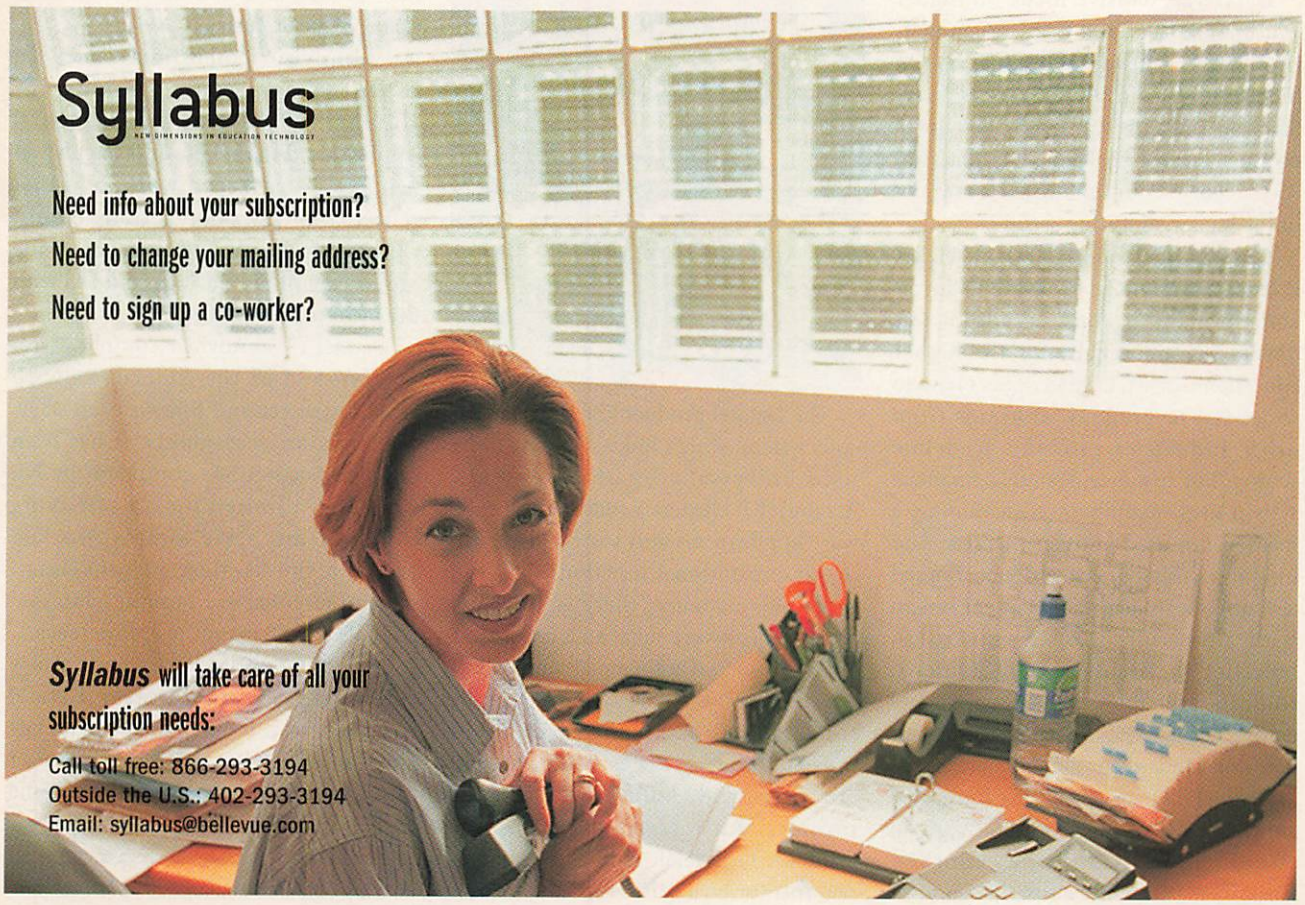
With those factors in mind, VUMC's information technology staff has created a patient tracking and operating room management system that follows each patient to each point of care, from admission until they are checked out of the hospital. As surgery patients enter the hospital doors, medical center employees known as "greeters" log them into the system using a wireless Compaq Corp. iPAQ Pocket PC, immediately notifying each station in the surgical care cycle that the patient has arrived. By accessing the surgical schedule, the greeter is also aware of the time that the patient's surgery is scheduled, which operating room is to be used, and who the patient's doctor is.

Once the patient is logged into the system, developed as part of a surgical center redesign project, the medical staff updates the patient's status as they proceed through pre-op, surgery, the recovery room, a move into the patient room and continuing until the patient leaves the hospital.

The iPAQ supports the secure, wireless exchange of patient information via an Intranet Web browser between the care provider and Vanderbilt's systems. The system avoids the need to store patient data on the iPAQ itself, which adheres to the requirements of the Health Care Insurance Portability and Accountability Act (HIPAA), federally mandated rules that take effect in 2003 governing the privacy of medical records and patient information.

Dr. Michael Higgins, an anesthesiologist and vice chairman for Adult Perioperative Services at Vanderbilt, said getting surgery patients into the tracking system quickly is the key to keeping the process moving efficiently. "We discovered that most of the delayed patients were actually at the medical center on time, but had simply gone to the wrong waiting area or otherwise couldn't be located right away," he said.

For more information, contact ***Michael Higgins*** *at* ***mike.higgins@vanderbilt.edu.***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FEATURED PRODUCT

Datatel Offers Web-Enabled Campus Management Software

For more than two decades, Datatel Inc. has focused on developing its information technology solutions exclusively for the higher education market. Datatel's products include integrated suites of administrative applications as well as software packages for specific applications such as human resources and finance. Flexibility is key to the company's success. As new technologies emerge, Datatel's software solutions have continuously evolved to keep pace with campus trends. The company began as a service bureau, later becoming a specialist in turnkey solutions. The latest product line from Datatel reflects its shift to Web-based and wholly-integrated solutions.

Datatel's exclusive focus on higher education sets it apart from its competition. "We've developed expertise in higher education best practices," says Shahron Williams van Rooij, director of product marketing. "Not only that, but 75 percent of our employees came out of the higher education setting."

Given its tight focus, you would expect Datatel to customize its solutions for its audience, and it does. Because it was developed specifically for the higher education market, Datatel doesn't have to shoehorn technology solutions from other industries into the academic setting. For instance, Datatel's financial system uses encumbrance accounting, a method not used in other markets. And unique to this type of product, Datatel also offers a student management system with open-entry, open-exit rules, reflecting the reality of nontraditional students' schedules. The system is date driven, not semester driven, to accommodate nonstandard enrollment patterns.

Datatel offers a completely integrated solution. All of its products work in coordination with one another. Customers pick and choose the components that best fit their needs. Because of its open architecture, Datatel's product line integrates with other vendors' software as well. Clients choose the platforms, academic software, and database applications they need, knowing that Datatel's system will fully integrate with outside products. Says van Rooij, "Datatel is continuously monitoring the market to ensure that our applications integrate with new products as they appear."

The Datatel product line starts with a core system, which holds the data to be used universally by other systems. Around that clusters a collection of software applications and suites, identified by the institutional functions they will serve. For instance, there is a human resources software suite, an e-commerce application, and a financial suite, all of which rely on the core system to supply fundamental data. One of Datatel's most popular suites is Colleague, an enterprisewide solution. Colleague includes four integrated systems: the Student, Financial, Human Resource, and Institutional Advancement Systems. At the center of Colleague, like the hub of a wheel, the Core System provides a central location for data, workflow development, and process rules that are used by all of the "spoke" systems. A system is in the works that is devoted to the specific needs of continuing education programs.

Users can access data via a standard user interface offline, of course, but Datatel also offers a campus portal, called CampusCruiser, through which users can access all of their pertinent data. WebAdvisor serves as the Web access to Colleague and other Datatel solutions suites. WebAdvisor ensures that students, faculty, employees, budget officers, and alumni can conduct transactions and access information online with a single sign-on. Through CampusPortal or WebAdvisor, for example, students can access information stored in the Student Suite. They can check on their degree programs, get their grades, and find updates on their financial aid status.

WebAdvisor comes in a variety of constituency-specific versions, including WebAdvisor for Students, Applicants, Financials, and Faculty. It features prepackaged workflows that reflect common campus transactions. Clients can use WebAdvisor out of the box, or can brand the look and feel with the included style sheets.

Datatel's WebAdvisor complies with Section 508 of the Americans with Disabilities Act and follows each of its directives for accessibility. It has been certified Section 508 compliant by Nu Visions Unlimited Inc., a certifying organization. "We simply worked through the Section 508 checklist, making sure that our product addressed all of its requirements," van Rooij says.

In addition to its plans to add a new continuing education system, Datatel continues to roll out new constituency applications for WebAdvisor. It's all part of the evolution process for this nimble organization.

For more information, visit ***www.datatel.com.***

Illustrated by Jack Hovey

Forms Commerce Streamlines College Admissions

College admissions is a two-way courtship. While the student waits anxiously for acceptance letters to arrive, the college conducts a more subtle courting, wooing potential applicants through a variety of marketing materials and strategies. High-profile universities carefully manage their images, luring the best students partly by playing hard to get.

Through it all, the number of forms and records required to complete the admissions process is staggering, requiring students and parents to stay organized and colleges to employ a small army of staff members to manage it all.

The development of companies that build and manage Web-based forms processing has enabled admissions offices to increase their online applications substantially. The online process helps colleges manage the flow of documents and reduce the load on staff. Going digital also opens up new opportunities to reach out to applicants in a proactive way.

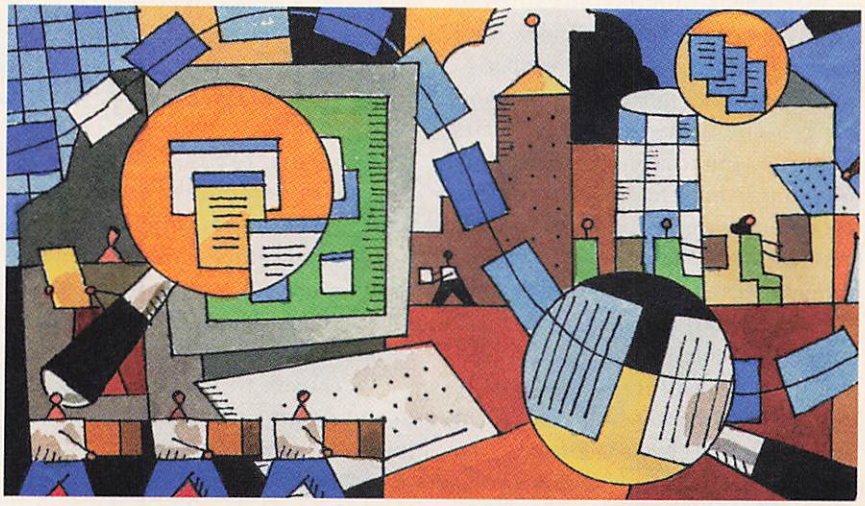
Several companies offer such forms commerce products in the higher education market, including CollegeNET Inc., whose Intelligent Connections technology creates a two-way conversation between the institution and the applicant.

Based in Portland, Ore., CollegeNET focuses its business on the nonprofit world: academia and the not-for-profit business sector. They have more than 600 higher education subscribers and dozens of nonprofits on their client roster, including the Monterey Bay Aquarium in California. Simply put, CollegeNET builds custom forms. Any form that a student would traditionally send via paper, CollegeNET can create online.

The company works with each school to create a custom forms management process, building each form from the ground up, not from templates. The school directs the process of choosing the forms needed and detailing the look and feel of the final documents. Once the forms are online, all data received—even personal essays—become part of the CollegeNET database. However, CollegeNET does not share the data with anyone other than the specific college or university in question. According to Paul Casey, the company's director of corporate communications, CollegeNET has led the way in advocating data privacy. Says Casey, "We don't touch the data and don't share or sell it. Everything a student sends to us is entirely confidential."

Institutional branding is an essential part of maintaining a college's identity. After all, every college is unique, whether due to its academic status, athletic prowess, desirable location, or innovative online degree program. CollegeNET works with institutions to maintain their brand integrity. Also, recognizing that students are more comfortable applying directly to a college rather than going through a third party, CollegeNET has made itself virtually invisible to the user. Users won't find any advertising or company logos on the admissions application page. The only indication that a third party exists is a tag line with the company's Web address and phone number for users who are having trouble completing the forms.

Online forms commerce has several advantages for clients. First, CollegeNET manages the entire process and ensures that forms are complete and error-free. Data validation technology guarantees that applications are complete by sending error messages that prompt students to go back and fix mistakes, such as filling in missing numbers from fields. They also can guarantee the institution 100 percent "hard apps": No application is accepted without attached payment or a qualified waiver of fees. In contrast, admissions offices often deal with dozens of paper "soft apps," appli-



"The software tracks visits, inquiries, applications, incoming and outgoing e-mail messages, and other correspondence."

Illustrated by Robin Jareaux

cations that arrive with no checks attached.

CollegeNET's technology easily pairs related documents sent from various sources. For instance, its Transcript Manager automatically matches the application to the transcript. These two related documents from separate sources used to travel separately to the institution. With Transcript Manager, both documents travel to the admissions office together, saving staff time in tracking and pairing them. CollegeNET forms also feature PDF printing capability and the ability to interface with campus student information systems.

Intelligent Connections software gives the client a universal view of all communication between a prospective student and the university admissions office. The software tracks visits, inquiries, applications, incoming and outgoing e-mail messages, and other correspondence. It routes appropriate parts of the application packet to other campus departments as needed, making the connections automatically without further data entry.

The online process also enables colleges to proactively market themselves to candidates via tailored communications, including CollegeNET's so-called human forms. Data triggers built into the technology prompt the software to send customized e-mails and requests for letters of recommendation. These triggers can also send students more information, encourage them to explore an interesting facet of the college's programs, or update them on the admissions process.

While completing forms, students may encounter a button embedded with a tailored message, based on data they have entered. For instance, a student who clicks on "No" in response to the question, "Have you visited the school?" may get an invitation to visit, a virtual tour, or a list of resources for arranging a visit.

Students also are discovering a number of benefits to applying online. First, they can apply for a free user ID before filling out the college application. With that user ID, any time a student fills out a CollegeNET application, standard information—such as name, address, and intended major—is automatically filled in. Also, with the user ID, a student can finish filling out the form over a period of time, and from more than one computer, without having to input data again. He or she can start the application at home and finish it in the guidance counselor's office.

Students also have access to an administration screen that notifies them that their applications were received. They can go to the screen for updates throughout the process. Counselors and parents stay in the loop as well; CollegeNET e-mails them automatically to thank them for referring and supporting the student.

By keeping in constant contact with all constituencies, CollegeNET helps manage the complex courtship between colleges and students with less stress on both sides.

For more information, visit http://corp.collegenet.com.

TECHNOLOGY ROUND-UP

Portal Security on Campus

Securing campus Web portals involves addressing a host of issues—access control, authentication, privacy, and security management—while still providing the ease of use of a single sign-on. Because there are so many security products out there, we've chosen to focus this month's Round-up on a few products that offer integrated solutions—that is, software that combines several approaches to the myriad portal security problems you might face.

Baltimore Technologies

Baltimore Technologies PLC offers several security solutions. SelectAccess 5.0 is the company's newest access control product. With features designed to simplify deployment and make the product easy to use, Version 5.0 offers a single point of management for wired and wireless users; single sign-on; role-based access; concurrent, multiple directory support; and "management-free" installation and configuration. SelectAccess's unique scanning mechanism automatically enumerates all network services and resources, such as URLs, dynamic pages, and portal links. By scanning the material, SelectAccess saves administrators from the time-intensive process of having to enter data by hand, which can result in typographical errors or simply the capturing of less data. SelectAccess components can be added in real time and configured automatically. In addition, SelectAccess supports many platforms and works with the leading Web and application servers, portals, and directories out of the box. Contact: Baltimore Technologies PLC, Needham, Massachusetts; (866) SECURITY; www.baltimore.com.

Entrust Secure Web Portal Solution

Entrust Inc. offers a suite of products designed to protect Web portals from unauthorized access and use. The suite—consisting of Entrust GetAccess, Entrust TruePass, and Entrust Authority software—provides identification, entitlements, verification, privacy, and security management capabilities for Web-based applications. Entrust GetAccess is standards-based entitlements software that serves as the security foundation for Web portals and includes support for wireless connections. Entrust TruePass, the company's digital signature product, provides further customer identification and capitalizes on the strength of Authority, Entrust's

public-key infrastructure and security management portfolio. Entrust TruePass also provides transaction verification and audit trails. Because it works on both intranets and extranets, users can access a Web portal via the Internet or via their desktop intranet connections. TruePass 6.0 offers optional methods of authentication, such as smart cards and tokens. The suite is compatible with an array of Web portal applications. Contact: Entrust Inc., Addison, Texas; (888) 690-2424; www.entrust.com.

Aladdin's eToken Enterprise

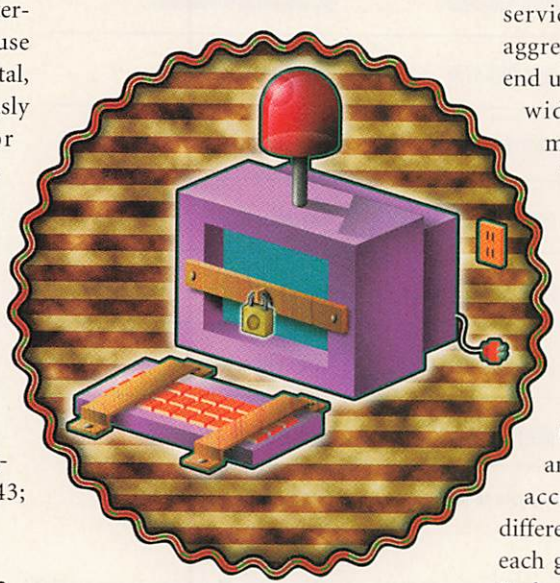
Unlike the other products profiled, the eToken secure access control product is a hardware, not software, solution. A portable USB device the size of a house key, eToken is now available in an enterprise version as a set of ready-to-use security solutions. For a campus portal, that might take the form of variously colored eTokens, with each color signifying a particular level of access to portal data. Staff might receive blue access tokens and students red access tokens, for instance. Systems administrators can easily integrate eToken into an existing security framework, providing increased protection for users' everyday operations. Contact: Aladdin Knowledge Systems, Arlington Heights, Illinois; (800) 562-2543; www.ealaddin.com.

Netegrity's Secure Relationship Management Platform

Netegrity Inc.'s Secure Relationship Management Platform provides customers with a platform for securing, delivering, and presenting enterprise resources for interactive e-businesses and campus portals. The platform combines identity management, single sign-on and access control with portal presentation and integration services. Integrated services are delivered as a set of shared services across all portal applications. Administrators can define user roles and resources as needed. The platform also offers integration with popular enterprise applications from Siebel Systems Inc., SAP America Inc., Lotus Development Corp., PeopleSoft Inc., and more than 75 other vendors. The suite consists of Netegrity's Interaction Server 5.0, SiteMinder 4.6, SiteMinder Delegated Management Services 2.0, and Affiliate Management Services. Contact: Netegrity Inc., Waltham, Massachusetts; (800) 325-9870; www.netegrity.com.

Evidian's PortalXpert

PortalXpert from Evidian offers plug-and-play centralized Web access control and single sign-on for intranet, extranet, and Internet users. PortalXpert builds an individual navigation menu for each user, based on institutional policy.



Primary features include a welcome page customized for each user's access profile, centralized auditing and tracking, and URL mapping, which enables administrators to hide confidential Web addresses behind the portal. Extended audit and alarm features enable security tracking and billing. A centralized security gateway acts as an intermediary between the browser and Web servers. PortalXpert plugs directly into existing Lightweight Directory Access Protocol (LDAP) directories and does not require any additional software, plug-ins, or cookies on either the browser side or the server side. It is compatible with leading portal and application server providers, which saves institutions from having to reinvest in order to achieve total integration. Contact: Evidian, Les Clayes-sous-Bois, France, www.evidian.com.

Sun ONE Portal Server

The Sun Open Network Environment (ONE) Portal Server (formerly iPlanet Portal Server) is the industry's first identity-enabled portal server solution. It provides all the user, policy, and identity management tools to enforce security, single sign-on, and access capabilities for end-user communities. The Sun ONE Portal Server also delivers personalized content, applications and services to end users by dynamically aggregating information based on an end user's role. The server works with a wide variety of authentication methods, such as Microsoft Corp. Windows NT domains, Unix, X.509 certificates, LDAP, Remote Authentication Dial-In User Service (RADIUS), and token-based mechanisms such as Secure Computing Corp.'s SafeWord, RSA Security Inc.'s SecurID, CryptoCard Corp.'s Cryptocard, Java Card technology, and smart cards. It can also provide access for various groups using a different authentication mechanism for each group. The Secure Remote Access Pack extends the capabilities of the Sun ONE Portal Server, delivering patented, on-demand, browser-based secure access to portal content and services from any remote device. It is a cost-effective, secure solution that is accessible to users from any device with a Java technology-enabled browser, eliminating the need for client software. Integration with the Sun ONE Portal Server ensures that users receive secure, encrypted access to the content and services that they have permission to access. Contact: Sun Microsystems Inc., Santa Clara, California; (800) 555-9SUN; www.sun.com.

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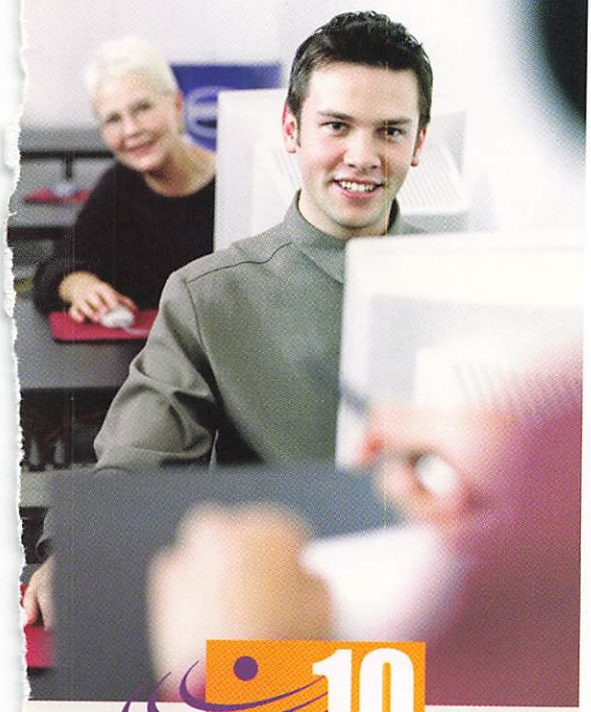

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